# An Examination of Concussion Education Practices

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**Abstract**

The purpose of this research project was to examine concussion education practices, and to recommend effective ways of delivering concussion education materials. A blended design included both quantitative and qualitative methods. The quantitative component was an evaluation of three separate concussion education tools (video, athlete's story, video + athlete's story) with parents, coaches, managers, and trainers of girls' minor hockey teams using the RoCKAS-ST questionnaire completed pre- and post-educational seminar. A repeated-measures ANOVA revealed that all groups scored high on the baseline measure of concussion knowledge and there were no significant differences in the effectiveness of the education tool used. There were some marked discrepancies between concussion knowledge scores and attitude scores. The qualitative component examined conference materials from the 4th International Concussion Summit hosted by the District School Board of Niagara in April 2016, using manifest and latent analysis. Qualitative analysis findings indicated the target audience should be the 'driver' for who delivers the educational message, messages should be tailored towards the specific audience, e.g. parents, coaches, athletes, and knowledge transfer should be an ongoing process.

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# Chapter I – Introduction

## Background and Significance of Research

Each year concussions account for more than 100 000 emergency department visits for children and adolescents in the US, with many younger people with concussion assumed to be seeking treatment through physicians' offices or not at all (Sady, Vaughan, & Gioia, 2011). Concussion is the most common type of mild traumatic brain injury and can have serious consequences (Tator, 2013). As defined by the International Consensus Conference on Concussion in Sport, concussion is "a complex pathophysiological process affecting the brain, induced by bio-mechanical forces," (McCrory et al., 2017). Public education about concussion is an important component to primary, secondary and tertiary prevention (Tator, 2013).

All personnel who are engaged in sports (i.e. coaches, trainers, parents, players) need to be aware of the importance of recognizing concussion symptoms and proper management (Tator, 2013). It is essential to educate these groups as well as teachers, therapists, and health care professionals in order to achieve improvement in the recognition, management, and prevention of sports concussion (Tator, 2013). Concussion education has taken many different forms, including presentations, athlete testimonies, discussions, videos, audience demonstrations, online courses, and social networking (Williamson et al., 2014). Depending on the format effectiveness has been shown to vary. Videos, demonstrations, and case studies from athletes have been shown to be effective (Williamson et al., 2014). National Collegiate Athletic Association (NCAA)-mandated concussion education in the form of a concussion fact sheet handed out at the beginning of the season was ineffective (Kroshus, Daneshvar, Baugh, Nowinski, & Cantu, 2014). Alternatively, concussion knowledge among coaches from a variety of sports improved after completion of an online course (Parker, Gilchrist, Schuster, Lee, & Sarmiento, 2015). Athletes sharing their experiences with concussion has been shown to be a more effective way for participants to recall information presented to them (Williamson et al., 2014; Kroshus et al., 2014).

There is research available to evaluate the effects of concussion education programs on concussion knowledge, but a lack of research on whether these programs change attitudes toward concussion. This is an important aspect to study because a coach may be aware of the consequences and importance of concussions but refuse to sit a player in an important game for the team (Echlin, 2010).

Incorrect management of a concussion can have drastic and long-term consequences (e.g. second-impact syndrome, epilepsy, chronic traumatic encephalopathy) for the athlete (Tator, 2013). When diagnosed and managed properly the short- and long-term impact a concussion has on an individual can be minimized, in many cases coaches and trainers play an important role in ensuring players receive the proper medical attention and abide by the return-to-play protocol. An educational seminar on concussion that includes both facts and athlete stories provided to coaches may be helpful in increasing their knowledge and changing their attitudes toward concussion in hopes of improving the playing experience for their players.

**Personal Background**

My history of playing hockey at an elite level with ambitions of playing at the University level naturally lead me into my research when I was sidelined in grade 12 after I sustained too many concussions. My first concussion occurred when I was 13 years old where I was knocked unconscious and don't remember anything from that day. I had multiple 'bell ringers' during my three years of playing at the Junior level, but it wasn't until I had a headache for two months that I received medical attention. Since then, I have been dealing with the repercussions of post-concussion syndrome which for me includes symptoms of headaches, fatigue, and periods of dizziness. This has been ongoing for about ten years. Throughout my playing career I sustained multiple concussions that my coaches, trainers and parents were all unaware of, although the level of knowledge about concussions back then was much lower than it is today.

**Research Questions**

My past experiences and a review of literature stimulated the following questions that were the focus of my research:

1.) Which of the following educational presentation formats is most effective in influencing women's youth hockey coaches, parents, and trainers' knowledge and attitudes toward concussion?

   a. Video presentation

   b. Athlete's story

   c. Video presentation and athlete's story

**2.)** What are the dominant priorities/themes in concussion education as shown by concussion conference materials?

The purpose of my research is to evaluate the level of knowledge and attitudes in coaches, parents, and trainers' pre- and post-seminar, to determine the effectiveness of the three different education seminars, and then evaluate materials that were presented at the 4th International Concussion Summit hosted by the District School Board of Niagara (DSBN), April 21-22, 2016, in partnership with the Ontario Ministry of Education, and Ontario Physical and Health Education Association (Ophea).

## Chapter II – Literature Review

### Definition of concussion

Concussion is the preferred term, as opposed to mild traumatic brain injury, because of the familiarity to the public (McCrory, et al., 2017). Concussion is often defined as representing the immediate and transient symptoms of traumatic brain injury (McCrory, et al., 2017). A concussion can occur without a direct blow to the head, meaning a person can sustain a concussion from whiplash or a blow to the body (Tator, 2013). A concussion can result in symptoms from four domains: somatic (headache, dizziness, nausea/vomiting), cognitive (difficulty with concentration or memory), mood (sadness, irritability, nervousness), and sleep (too much or too little, difficulty falling asleep) (Choe, 2016). A concussion is typically a functional brain disturbance rather than a structural injury, meaning a concussion cannot normally be detected through conventional structural neuroimaging; CT scan, MRI (McCrory et al., 2013). Although it was originally believed that most symptoms resolve within a short period, 7-10 days for a majority of individuals (80-90%), it was recognized that the recovery time frame may be longer in children and adolescents (McCrory, et al., 2005).

At the 5th International Concussion Conference researchers made the determination that predicting recovery time was counterproductive, although the severity of a person's initial symptoms in the first day or initial few days after injury may be a predictor of slower recovery (McCrory, et al., 2017). Children and adolescents with a history of mental health problems or migraine headaches are at somewhat greater risk of having symptoms for more than one month. Some of the evidence presented at the conference suggests that the teenage years might be the most vulnerable time for having persistent symptoms. Hutchison, Comper, Csenge, and Richards (2014) completed a retrospective chart review on a group of male high school athletes to describe recovery time and the contribution of pre-existing psychosocial and learning disabilities to concussion recovery. They found the students were medically cleared to return to activities or sport after an average of 38 days post-concussion, which is far longer than the previously mentioned expected recovery time for adults. Significant differences were identified between the groups of students with pre-existing conditions (anxiety, depression, ADHD, or learning

disability) and students without; students with pre-existing conditions had significantly longer recovery times. This information is valuable when educating parents, coaches, and trainers of adolescent athletes as it varies from the still commonly reported recovery period of 7-10 days for adults.

**Prevalence of Concussions in Teens**

Concussion has become a common injury among youth and adolescent athletes and is a public health concern because of the frequency of occurrence and potential short- and long-term consequences. According to the Government of Canada (2016), 39% of children and youth (10-18 years) who visit an emergency department for a sports-related head injury were diagnosed with a concussion, and 24% were possible concussions. Further, there was a greater than 40% increase in rates of reported head injury between 2004 and 2014 in football, soccer and hockey for children and youth. Children and youth, as reported by Think First, account for 30% of all concussions, many of them sustained while participating in sports and recreational activities (http://braininjurycanada.ca/acquired-brain-injury/).

**Population**

Adolescents (13-16 years) may be more vulnerable than children and adults to the consequences of concussions, as suggested by the persistent deficits observed post-concussion on neuropsychological tasks assessing working memory (Baillargeon, Lassonde, Leclerc, & Ellemberg, 2012). This may be because during adolescence the frontal lobe of the brain, which is responsible for working memory and other executive functions, undergoes its final stages of maturation (Luna, Garver, Urban, Lazar, & Sweeney, 2004). Players with a history of previous concussions are more likely to have future concussive injuries than those with no history. Football players with a history of three or more concussions were three times more likely to sustain another concussion (Guskiewicz et al., 2003). Female athletes have been shown to have higher rates of concussions in high school and collegiate sports played by both sexes, which may be due to head and neck acceleration differences (Gessel, Fields, Collins, Dick, & Comstock, 2007). Vasavada, Danaraj, and Siegmund (2008) studied pairs of male and female subjects, matched for standing height and neck length. Most head and neck anthropometric parameters were significantly smaller in females compared to males. Female necks were also significantly weaker than male

necks. Cultural explanations may also play a role in the gender differences, as males may be encouraged to play through their injuries to show signs of masculinity. McKeever and Schatz (2003) reviewed literature based on prevalence and management of concussions and found the same trend of higher rates of concussions in high school aged females playing soccer, softball, and basketball; although the trends did not appear to carry over to all sports or to athletes of all age ranges. Girls have been shown to be at a greater risk for having more persistent symptoms post-concussion than boys (McCrory, et al., 2017).

**Consequences**

Part of the difficulty of recognizing and diagnosing concussions stems from the diverse list of signs and symptoms associated with them. There is a wide range of signs and symptoms that individuals may experience to different degrees, including headache, dizziness, nausea/vomiting, confusion, amnesia, slurred speech, visual changes, sensitivity to light/sound, unusual emotions, or seizure. Loss of consciousness is a rare sign of a typical concussion however in the past it was often incorrectly viewed as a key sign. If a concussion is not diagnosed and treated correctly there is a cause for concern of possible second-impact syndrome, post-traumatic epilepsy, psychosocial consequences, or chronic traumatic encephalopathy (Tator, 2013). Some players may lie about, or deny, having any symptoms from an incident to avoid sitting out of activities, missing important games, or falling behind in school. It should be emphasized that failing to report concussion symptoms may result in more time spent away from the game and may put the athlete at risk for a career ending injury (Asken et al., 2016). If a player hides symptoms from coaches, parents, and trainers, and continues to play they are putting themselves at risk for sustaining a second concussion before the first one has resolved, possibly resulting in second-impact syndrome. This can cause cerebral swelling, raised intracranial pressure, and subsequent brain herniation (Tator, 2013). Most individuals who have developed second-impact syndrome have either died, or had major neurological deficits. Other risk factors of playing while concussed included bringing on new symptoms and worsening old symptoms (Tator, 2013). Asken et al. (2016) suggested that immediately reporting concussion symptoms is in the best overall interest for the athlete so performance is not affected by the concussion, and they miss the least amount of playing time possible. Participants in a study of

athletes' concussion knowledge reported that while they were knowledgeable about concussion, during a competition this knowledge was not relevant as they were taken over by adrenaline and they were 'not thinking, just doing' (Chin & Porter, 2016). This same study revealed through interviews, that participants' knowledge of concussion was used to self-assess a 'minor' concussion, but they did not notify a trainer or coach as they felt a sense of duty to their team to continue playing.

**Assessment**

As discussed at the 5th International Conference on Concussion in Sport the SCAT5 is identified as the most well-established and rigorously developed instrument available for assessing a sport related concussion (McCrory et al., 2017). It is designed for use by physicians and licensed healthcare professionals for evaluating athletes aged 13 years and older (Davis et al., 2017). The Child SCAT5 is to be used for children aged 12 years or younger. The SCAT5 is most effective in immediate detection of concussion-like symptoms, but its utility significantly decreases 3-5 days after the injury. The SCAT5 assesses level of consciousness (using the Glasgow Coma Scale), balance, coordination, short- and long-term memory, and coordination (Putukian, 2017).

**Management**

Proper management strategies are essential to have in place to ensure all athletes who sustain a concussion fully recover before returning to the classroom or returning to activity. For an athlete to be considered fully healed or recovered from concussion, they must gradually return to daily activities without any signs or symptoms returning or worsening. Recovery can be broken down into two components: getting back to the classroom or to work, and returning to physical activity, i.e. playing sports. In both cases, progress is determined by the disappearance of signs and symptoms of concussion. Getting back to school or work, i.e. Return to Learn (RTL), involves a 6-step graduated protocol in which each step can be broken down into three different components; physical, cognitive, and sensory (Csenge, Hutchison, Sheridan, Richards, & Comper, 2013). The RTL gradual protocol was developed initially by Csenge et al. (2013) and offers guidelines for returning to the classroom that can be adapted to accommodate each student's unique situation. The following table outlines the RTL protocol:

Table 1 shows the Return to Learn protocol

| Stage | Physical | Cognitive | Sensory |
|---|---|---|---|
| 1 | • No attendance at any school activities | • No attendance at classes<br>• No assignments, studying, tests | • Very little or no screen time<br>• No group work/meetings |
| 2 | • No gym/PA classes<br>• No field trips<br>• No labs or clinics | • Trial attendance with no note-taking<br>• Little or no participation expected in discussions<br>• No assignments, studying, tests | • Minimal screen time<br>• No group work/meetings<br>• No tech/media/music classes |
| 3 | • Participation in gym/PA classes according to Sport progression<br>• No field trips<br>• Limited clinics or labs | • Progression of attendance<br>• Participation in class<br>• Note-taking (possible assisted)<br>• No assignments, studying, tests | • Minimal screen time<br>• Limited group work/meetings<br>• No tech/media/music classes |
| 4 | • Participation in gym/PA classes according to sport progression<br>• Limited clinics or labs<br>• No field trips | • Attendance at academic classes<br>• Near normal participation<br>• Progress studying/homework<br>• No assignments or tests | • Increased screen time<br>• Increased group work<br>• No tech/media/music classes |
| 5 | • Participation in gym/PA classes according to sport progression<br>• Near normal participation in clinics or labs<br>• Brief field trips | • Full attendance<br>• Full participation<br>• Full note-taking<br>• Near-normal studying<br>• Assignments with accommodations<br>• No tests | • Near normal screen time<br>• Normal group meetings<br>• Some work on group assignments<br>• Limited tech/media/music classes |
| 6 | • Full participation in gym/PA classes, clinics, labs, and field trips | • Full academic activities | • Normal screen time<br>• Normal group work<br>• Normal tech/media/music classes |

As discussed at the International Consensus Conference on Concussion in Sports, concussion management research is limited, though an initial period of rest is still believed to be of benefit (McCrory, et al, 2013). Although it is still reported that there is insufficient evidence that complete rest is beneficial in diminishing symptoms, an initial rest period of 24-48 hours is recommended before patients are encouraged to become gradually and progressively more active while not worsening or bringing on new

symptoms (McCrory, et al., 2017). When the athlete notices that their symptoms have diminished, they can begin the 6-step process of RTL beginning with gentle activity guided by symptoms (e.g. walking, 15 minutes of screen time twice daily, reading). Stage 3 involves returning to school with modified academics, for example, start by going for an hour, then half days, and there should be no tests or homework lasting longer than 45 minutes. The next step is back to a nearly normal routine; i.e. back to full days of school, but with less homework and no more than one test per week. The final stage is returning fully to school and this involves a return to normal routines (i.e. attendance, homework, tests and extracurricular activities). The child or adolescent should not move onto the next stage until they are fully symptom free.

Recovery from concussion symptoms (i.e. headaches, dizziness, etc.) is a key component to the RTL protocol. These symptoms not only have an effect on the brain's ability to learn, but there is also increasing evidence that returning to a full academic load too early can worsen symptoms and even prolong recovery (Majerske et al., 2008; Carson et al., 2014). A retrospective study based on electronic medical record chart review assessed 159 patients with sport-related concussion during a 5-year period (April 2006 to March 2011); 41 elementary school students, 95 high school students, and 34 college or university students (Carson et al., 2014). This study concluded that 44.7% of patients experienced recurrence or worsening of their concussion symptoms as they returned to school, suggesting that they had not adequately recovered. Student athletes must complete the RTL protocol before returning to their sport or activities. Learning is the main vocation of children and adolescents, with sports and activities being secondary to academics. The RTL process must be carefully monitored at first by parents and then by a teacher or learning resource person at the school, as it is difficult to determine the level of cognitive and physical activity that is tolerable for each individual, and these constantly change throughout the course of recovery.

Returning to play (RTP) tends to be a greater concern for both athletes and parents in relation to concussion. Like the RTL protocol, the RTP protocol also has six stages, and is broken down into the same three components; physical, cognitive, and sensory.

Table 2 shows the Return to Play protocol

| Stage | Physical | Cognitive | Sensory |
|---|---|---|---|
| 1 | • No sports<br>• No working out<br>• Isometric neck rehab | • No studying playbooks<br>• No other team materials | • Very little or no communication with the team<br>• No team meetings or functions<br>• Avoid noisy team rooms, gyms, etc. |
| 2 | • Stationary bike<br>• Gradual increase of intensity and duration<br>• No head movement | • Limited exposure to cognitive tasks (e.g. studying playbooks) | • Limited communication or social interaction related to team<br>• No team meetings or functions<br>• Avoid team rooms, gyms, etc. |
| 3 | • Sport-specific drills that involved increased progression of head movements while maintain intensity and duration achieved in previous stage | • Increase exposure to cognitive tasks | • Increased communications or social interaction<br>• Brief team meetings permitted<br>• No attendance at practices or games |
| 4 | • Continue sports specific drills with additional visual tracking and cognitive components<br>• Light resistance training including floor and body weight exercises | • Add cognitive tasks to sport-specific drills (e.g. decision-making drills such as whether or when to pass, whether to turn left or right, etc.) | • Increased communications or social interactions<br>• Team meetings, attend practices to perform prescribed exercises<br>• Avoid games |
| 5 | • Heavy resistance training<br>• Full participation in controlled-risk, non-contact practices | • Near normal participation in all cognitive aspects of sport/physical activity | • Near normal communications, and social interactions related to sport/physical activity<br>• Attend all team functions |
| 6 | • Full participation in sport/physical activity | • Full participation in all cognitive tasks involved in sport/physical activity | • Normal sensory exposure and social interaction related to sport/physical activity |

For both protocols, RTL and RTP, the student-athlete should not proceed onto the next step until they are completely asymptomatic at the previous step. It is difficult to predict how long each step will take, although it should be a minimum of 24 hours for each, meaning the earliest a concussed athlete can return to play is one week after injury. If the athlete experiences any concussion symptoms throughout

the process, they must return to the previous step until symptoms have once again disappeared. Children and adolescents should not return to sport until they have successfully returned to school, although early introduction into symptom appropriate physical activity is recommended (McCrory et al., 2017). According to Tator (2013), the athlete should be cleared by a physician in order to return to practice after stage 4. Those that are slow to recover may benefit from low-level exercise, although there is a lack of evidence to suggest a timeline for this treatment (McCrory, et al., 2013). In their study of students from elementary school to university and college age, Carson et al. (2014) also reported 43.5% of patients experienced recurrence or worsening of concussion symptoms following RTP too early. If the protocol is not followed properly the athlete is also put at risk for second impact syndrome, epilepsy, chronic traumatic encephalopathy, and possibly death (Tator, 2013).

**Education**

Coaches, trainers and managers are the first line of contact with youth and adolescent athletes at the playing site, which places an increased responsibility on these leaders to ensure the safety of each player. Therefore, it is important that all individuals involved in youth sport are educated on the signs and symptoms of a concussion, proper management strategies, and how to respond in an appropriate manner. Tator (2013) discusses the importance of concussion education as an essential component of primary, secondary, and tertiary prevention of injury. The existing need to educate coaches is highlighted by Cavassin, Elbin, and Sarmiento's (2012) findings that 50% of youth sport coaches reported learning something new about concussion after reviewing concussion education material. Athletes look to their coaching staff (coaches, trainers, managers) for guidance both on and off the playing field, increasing the importance of ensuring all personnel are properly educated.

Tator (2012) discusses the possibility of mandatory concussion education leading to a reduction in incidence rates, and improved compliance with reporting and management. In addition, Sady, Vaughan, and Gioia (2011) suggest that the more people know about concussion before it occurs, the higher probability that the concussion will be identified and managed properly prior to the athlete returning to activities. Although there are concussion education materials and seminars publicly

available, there seems to be a lack of knowledge in the community of youth sport (Bagley et al., 2012; Covassin, Elbin, & Sarmiento, 2011). Kroshus, Stellino, Chrisman, and Rivara (2018) reported that only two thirds of parents (236 total) of youth soccer players discussed the importance of concussion safety with their children, thus making it more important to educate parents, coaches and trainers to encourage them to have these conversations.

**Types of Education/Awareness Programs Available**

Concussion education programs and resources are becoming more readily available online for coaches, trainers, parents, and players involved in youth sport. These programs generally consist of defining the word 'concussion', presenting the signs and symptoms, facts, and proper management strategies. Many of these resources offer separate modules targeted towards the different stakeholders in the management of concussion (i.e. medical professionals, coaches, trainers), and several examples will be discussed below.

**Coaches/Trainers.**

Centers for Disease Control and Prevention (CDC) has designed a Heads Up toolkit to help prevent, diagnose, and manage concussions. The toolkits are each tailored towards specific audiences: coaches, trainers, and parents. They generally contain fact sheets, handouts and teaching guides (Williamson et al, 2014). The Heads Up toolkits can be located on their website (http://www.cdc.gov/headsup/youthsports/coach.html). Materials from Heads Up: Concussion in Youth Sport have been used in studies to test levels of knowledge in youth sport coaches, and to verify the need to continue to educate the leaders in our community (Covassin, Elbio, & Sarmiento, 2011).

The Concussion Awareness Training Tool (CATT) has three separate toolkits for the following groups: medical professionals; coaches, parents, and players; and school professionals (http://www.cattonline.com/). These toolkits have been developed by the BC Injury Research and Prevention unit and consist of a variety of videos (e.g. professional athletes on their experiences with concussions, educational videos), online courses and other resources (i.e. concussion incident report forms, RTP handout, and handouts for identifying symptoms) for recognition, treatment and management

of concussion. Each toolkit has information targeted towards the specific population, and resources to assist in their field.

The Brain 101: The Concussion Playbook is an online resource developed for coaches, educators, parents and teen athletes (http://brain101.orcasinc.com/). The coach section of the website offers a 20-minute program which educates on how to recognize and respond to a concussion, and strategies to reduce the risk of a concussion (Williamson et al, 2014). This program has quizzes for each section, short videos and answers to specific questions. The website also offers additional resources on concussions in the form of checklists, guidelines, and posters.

**Players/Parents**

The Sports Legacy Institute Community Educators (SLICE) program was developed to raise awareness on concussion prevention and management in high school-aged student athletes. Information included in the presentation discusses how to identify a concussion, correct forms of treatment, and how to support a teammate who may have a concussion. These presentations are delivered by 2 or 3 university student volunteers in the medical field (Bagley et al, 2012). The duration of each presentation is between 40 and 60 minutes, and includes PowerPoint slides, video segments, demonstrations with audience members, case studies of professional and high school athletes, interactive discussions with audience members, and a question and answer period.

Think First Concussion was developed for school-aged athletes to use prior to a sports season with the objective that the students will be better prepared to prevent, recognize, and respond correctly to a concussion (http://thinkfirst.org/concussion). The presentations include a 10-minute film which features personal testimonies from ten speakers who have sustained a brain or spinal cord injury, a discussion about the anatomy of the brain and how these injuries occur and can be prevented, a speaker who has sustained an injury and discusses how this injury has changed their life and finishes off with a question and answer period. The Think First materials are now provided by Parachute (http://www.parachutecanada.org/concussion). Parachute offers online programs, resources, and an

educational app for parents, coaches, educators, and health care professionals. Links are provided to different areas: research, guidelines, videos, and online courses.

The Brain 101: The Concussion Playbook also offers a program for teen athletes (http://brain101.orcasinc.com/). The objective of this program is to show the athletes how to spot the signs and symptoms of a concussion, and how to manage the symptoms to return to play (Williamson et al, 2014). This program starts off with a 5-minute video, followed by a slide show with three major headings: recognize, report, and rest.

Barrow Brainbook was launched in 2011 by Barrow Neurological Institute, a treatment and rehabilitation centre in Arizona. They provide a web-based learning tool to educate high school athletes on how to prevent, recognize, and respond to concussions (https://www.barrowneuro.org/get-to-know-barrow/centers-programs/concussion-brain-injury-center/barrow-brainbook-login/). This internet-based tool uses a social network interface, videos of professional athletes and doctors, footage of sports concussions, and computer-generated animations to deliver the educational content (Williamson et al, 2014). They have also developed a video game that educates young children about concussion, by teaching kids how to play smart and safely avoid collisions on the football field.

The CDC created a mobile gaming application called HEADS UP Rocket Blades to educate children ages six to eight years about concussion safety (Daugherty et al., 2018). The object of the game is to top your high score from your previous game. Before the game begins the children must watch a short video about concussion safety where it defines concussion, emphasizes the importance of safety gear, states the importance of avoiding head injury, and states that it is important for children to rest and take a break from play after experiencing a head injury.

Concussion education materials are also available on various hospital and rehabilitation center websites, such as Children's Hospital of Eastern Ontario (http://www.cheo.on.ca/en/Concussions) and Holland Bloorview Kids Rehabilitation Hospital (http://hollandbloorview.ca/programsandservices/concussioncentre).

**Effectiveness of Programs**

Educational programs are delivered in many different formats, including presentations, slideshows, professional player case studies, and online seminars. When developing an effective educational tool there are five principles that need to be considered: who is the target audience, what is the message being delivered, who is delivering the message, how is the message being transferred, and what is the impact of the knowledge transfer (Provvidenza, & Johnston, 2009). Research studies evaluating educational programs have determined the level of effectiveness through pre- and post-testing of knowledge in a specific area, and whether the participants gained more knowledge (Bagley et al., 2012; Covassin, Elbin, & Sarmiento, 2011). Kroshus, Daneshvar, Baugh, Nowinski, and Cantu (2014) conducted a study with 146 players from 6 collegiate ice hockey teams on the concussion education mandated by the NCAA. They concluded that it was ineffective due to the variability in content and delivery, although the players who received video player stories had the highest rate of recall across all teams and types of educational materials. It is important to consider the five principles for developing an effective educational tool in order best educate your audience.

There seems to be a lack of evidence on the effectiveness of Brain 101: The Concussion Playbook, and the ThinkFirst materials. Based on unpublished data collected by the Brainbook, which is an internet-based tool that uses a social network interface, videos of professional athletes and doctors, footage of sports concussions, and computer-generated animation to deliver educational content, Brainbook has produced a change in attitude about concussion among high school athletes (Williamson et al., 2014). Coaches who viewed the CDC Heads Up content available in the toolkit were satisfied, felt they became more knowledgeable with identifying concussion in student athletes, and could respond in an appropriate manner to athletes with concussion-like symptoms. Covassin, Elbin, and Sarmiento (2011), found the CDC educational materials to be effective based on 50% of the youth sport coaches they studied, reporting learning something new about concussion from the material they received. SLICE has been shown to be effective by Bagley et al. (2012) based on student responses on quizzes administered pre- and post-presentation. All age groups and gender subgroups showed significant improvements in

concussion knowledge. CDC's Rocket Blades game was found to be effective based on the participants understanding of at least one of the learning objectives which were: 1) hitting your head can cause a brain injury, 2) you should tell your coach, parent or another adult if you hit your head, and 3) you should rest before returning to play and see a doctor after a concussion (Daugherty et al., 2018). All of the children understood at least one of the learning objectives and were able to report on all three.

**Utilization of programs**

Hockey Canada requires all coaches to be certified, with the degree of certification dependent on the age group and level they are coaching (http://www.coach.ca/hockey-p154479). Through the National Coaching Certification Program (NCCP), Hockey Canada offers two different workshops: Community Sport, and Competition, with each program having different requirements, length of course, and learning objectives. The Community Sport workshop is an 8-hour clinic with the following learning objectives: use Hockey Canada resources to plan activities; communicate effectively with players, parents, officials, and league administrators; encourage participants and work within fair play guidelines; conduct safe, effective and age appropriate on-ice practice drills; and apply an ethical decision-making process. The Competition workshop is a 14-hour, 2-day clinic with similar learning objectives that focus on more specific skills and situations. Both workshops require the participants to pass a "Make Ethical Decisions" module either online or in class prior to completion of the course. This module includes all types of injuries and standard protocols on allowing athletes to return to play. During the workshop, the instructor is to touch on concussion and the importance of proper management through their slideshow presented to participants. This format assumes that the instructor has enough knowledge to present and discuss the topic of concussions with accuracy and understanding. Hockey Canada does have a website with information, tools, videos, and guidelines that can be easily accessed at https://www.hockeycanada.ca/en-ca/Hockey-Programs/Safety/Concussions/Facts-and-Prevention.

The Ontario Women's Hockey Association (OWHA) clearly presents their concussion policy in their handbook for players, stating that players must be removed from play if suspected of having a concussion. They may not return to play until they have medical clearance, and the OWHA references

Hockey Canada's return to play guidelines (http://owha.pointstreaksites.com/files/uploaded_documents/3323/2015-2016OWHA-Handbook.pdf). The OWHA works under Hockey Canada and adopts their rules and regulations. Therefore, they do not require coaches to undergo any form of specific concussion education prior to working with youth and adolescents. One coach per team must complete the coaching course for the age specific level they are coaching, which includes a small segment on concussion. They recommend that each team hold a pre-season meeting with players, parents, and coaching staff in attendance to view the Think First Smart Hockey video supported by Dr. Charles Tator available on www.parachutecanada.org. They offer a link to the concussion app that is available through Hockey Canada, but that is the extent of the resources offered.

The Flamborough Girls Hockey Association (FGHA) does not require any mandatory training for coaches, trainers, or parents on concussion, although they did require that their rep players from Peewee (aged 12-13) to Midget (aged 15-17) complete baseline testing prior to beginning their season (http://www.fgha.ca/page/show/945350-concussion-resources). Currently baseline testing is no longer required but still recommended by the association. Through their website, the FGHA provides links to information specifically for parents and players, or coaches and trainers, as well as general concussion information, their organization policy, and baseline testing frequently asked questions. These resources are from Parachute Canada. These resources are easily accessible through the FGHA website, but are not mentioned at coaches' meetings, or in email blasts sent to parents and coaching staff within the organization.

The Policy/Program Memorandum No. 158 (PPM 158) is a memo that has been created by the Ontario Ministry of Education, effective January 2015, stating policies and guidelines on concussion that all school boards in Ontario must develop and implement in their schools (http://www.edu.gov.on.ca/extra/eng/ppm/158.pdf). The memo outlines the definition and diagnosis of concussion, proper development of a policy and development of awareness, prevention, identification, management procedures, and training materials. Although the provincial government has outlined

policies that must be in place in the educational system, there is no mandatory education for teachers or administrators to enable them to understand, identify, and correctly manage concussions in children. Some school boards currently offer concussion education for teachers and coaches during professional development days, while others meet the minimum policy standard (e.g. one or two teachers have specialized training in concussion recognition).

Mandated use of a proven effective program may not guarantee a consistent application of concussion knowledge by athletes, coaches, trainers, or parents. Cultural and social aspects of sport, more specifically hockey, may prevent the seriousness of concussion and the long-term effects from being appropriately recognized (Echlin, 2010). Echlin et al. (2010) assessed the incidence of concussion in fourth-tier junior ice hockey players, 16-21 years old, and found that two out of the seventeen players who sustained a concussion during their study admitted that they concealed a concussion to continue playing during the season the study was conducted. The authors discussed cultural factors leading to reluctance to report concussion symptoms including 'masculinity' in the sport of hockey characterized by playing through the pain of an injury, and the mindset that winning is more important than the health of the athlete. Kroshus, Baugh, Daneshvar, and Viswanath (2014) assessed perceived outcomes of reporting concussion symptoms in male Junior A ice hockey players (18-21 years old) and found the following items received the highest mean score: "I will be allowed to start playing or practicing when I think I'm ready," and "I will lose my spot in the lineup." Few players agreed or strongly agreed with the following statements: "My teammates will think I made the right decision," and "I will be better off in the long run." Kroshus, Garnett, Hawrilenko, Baugh, and Calzo (2015) studied the pressures experienced by U.S. collegiate athletes to continue playing while experiencing concussion symptoms and found that one in four athletes experienced pressure from a teammate, coach, parent, or fan to continue playing. These pressures within a team environment further support the need to educate all individuals involved in a team sport about concussions, to properly support athletes and provide a safe environment. Kroshus et al. (2015), found that athletes tend to think that they have safer attitudes about concussion reporting than do

their teammates, meaning that they believe they would report concussion like symptoms, but do not believe that their teammates would do the same. To battle the lack of concussion symptom reporting and apparent attitudes toward concussion, an educational program needs to be developed to not only promote an increase in knowledge but also a change in attitudes towards the seriousness of the injury.

In the previously mentioned study by Echlin et al. (2010), it was common to receive complaints from coaches, players, and parents concerning the inconvenience of multiple visits to a physician for concussion testing which was required to return to play. The researchers originally had two teams participating in their study but one of them withdrew after game 21 of the 36-game season due to their unwillingness to follow the RTP protocol. This apparent disregard for the RTP protocol supports the attitude that winning is more important than the safety of the individual players, and the importance of players being able to play through the pain of injuries. Individuals who influence an athlete i.e. parents, coaches, trainers, managers, have a responsibility for concussion identification, treatment, and prevention in youth sports (Echlin, 2010). The support team around the players should be providing a safe environment by encouraging them to disclose injuries to trainers and get further help when needed, as opposed to encouraging athletes to play through their injuries. The safety of the athlete should supersede any game or team function regardless of the importance of the game. Cusimano, Cook, Tator, Mansfield, and Ulrich, (2002) found that 22 out of 34 minor hockey league coaches studied believed that having their players watch a video about concussion prevention would make their players less aggressive, therefore less successful as a team. This attitude in coaches highlights the 'masculinity' attitude within hockey and supports players playing through injuries without disclosing them to coaches or trainers. An editorial written by Echlin (2010) reports a situation where a coach allowed his son to play in a playoff game when advised by a certified trainer that he should not be playing. Earlier in the same season, this coach sat his son out due to concussion symptoms but decided against it later in the season due to the importance of the playoff game.

The term concussion has become more commonly used in the media, which helps highlight concussions and the seriousness of this issue to all stakeholders within sport (Provvidenza et al., 2013).

However, information presented in the media is not always correct with respect to proper management strategies and how to detect concussion symptoms. In his editorial, Echlin (2010) discusses how parents become overly invested in their child's success and reinforce the athlete's fear of losing ice time or falling behind their peers if they admit to concussion symptoms. The biggest concern of parents reported by Echlin (2010) is the amount of money they have invested in their child's season and if the child has a concussion they are missing out on opportunities that the parents have already paid for. It was also noted that concussion is an invisible injury (you can't see anything wrong with the player), and when parents can't see anything visibly wrong with their child then they believe their child can continue to play. McLeod, Schwartz, and Bay (2007) concluded that the misunderstandings among youth hockey coaches in their study supported further education regarding sport-related concussions. These misunderstandings include loss of consciousness is required for a concussion to occur, a minor concussion does not require removal from competition, and a symptomatic athlete can return to play. Kroshus et al. (2015) discussed barriers to athletes reporting their symptoms, which included what they think their parents would want them to do when it comes to concussion reporting. Parents need to understand the importance of reporting concussion symptoms and encourage their children to do so from the beginning of the season. Further research needs to be completed on concussion education and the correlation with attitude toward concussion. This literature review supports the two research questions to be examined in this study; which examines the most effective educational presentation format in influencing women's youth hockey coaches, parents, and trainers' knowledge and attitudes toward concussion in three different presentation formats and looks at the dominant priorities/themes in concussion education as shown by concussion conference materials.

## Chapter III - Philosophy and Process of Research Methods

### Introduction

I used a blended-approach to answer my two research questions. My design chapter is divided based on my two research questions and the corresponding approaches. A traditional empirical approach was used to explore my first question as outlined in Part 1 below, and a qualitative descriptive/interpretive approach was used to explore my second question as outlined in Part 2 below. Part 1 examined my first research question: which of the following educational presentation formats is most effective in influencing women's youth hockey coaches, parents, and trainers' knowledge and attitudes toward concussion? A) Video presentation, B) Athlete's story, C) Video presentation and athlete's story. Part 2 examined my second research question: What are the dominant priorities/themes in concussion education as shown by concussion conference materials?

### Part 1 Quantitative

#### Methodology.

The approach that informed the design features for Part 1 of this research project was postpositivism, which has elements of being reductionistic, logical, and cause-and-effect (Creswell, 2013). Postpositivist researchers view inquiry as a series of logically related steps and believe each participant may have a different perspective rather than there being a single reality from all participants (Creswell, 2013). A responsive action sensitive model was used to explore the effective use of concussion education. This approach evaluated the persuasiveness of a presentation. I have found there to be a lack of education provided directly to minor hockey coaches and trainers within our community, although there is information readily available through the internet. The responsive action sensitive model was further informed by Stuart Hall's (1980) 'encoding-decoding' framework, which examines audience response relative to presenter intentions.

**Participants.**

Part of the data collection process requires identifying participants, based on who might be best to provide an answer to the proposed research question (Savin-Baden & Major, 2003). Purposeful sampling is a deliberate sampling strategy in which settings, persons, or activities are selected to provide specific information that cannot be attained as well from other choices (Maxwell, 2005). Due to the nature of this research project it required purposeful sampling, as I was looking at community level coaches or personnel who are directly working with youth in an athletic setting. Most Community coaches are responsible for the wellbeing of their athletes, along with the team trainer, and have the final say in whether their athlete will return to play. Developing an understanding of their knowledge and attitude toward concussion pre- and post-seminar will allow me to evaluate the effectiveness of my presentation. Savin-Baden and Major explain the importance of the accessibility factor and timing to participants (2003). Coaches, trainers, manager, and parents were invited participants: coaches, assistant coaches, trainers, managers, and parents to participate in my questionnaire and seminar during the 2016/2017 and 2017/2018 season in two different girls' hockey associations: Flamborough and Ancaster. The purpose of choosing this set of participants was based on my involvement as a coach in the Association or the location of the associations relative to my hometown.

**Consent and Procedure.**

Approval to contact coaches in each association was sought from each of the League Presidents (Appendix B). The coaches of the two associations (Flamborough & Ancaster) were contacted via email (Appendix A) containing the letter of invitation and consent form combined (Appendix C). If the coaches chose to participate in the study, they notified the principal student investigator of their interest to attend the educational seminar. Upon arrival, they had a chance to ask any questions they had about the research before signing the consent form. Once all consent forms were signed, everyone was asked to complete the modified RoCKAS-ST objective pre-questionnaire (Appendix D) that evaluated their knowledge about and attitudes toward concussion (Rosenbaum & Arnett, 2010). The modified version that I used

consists of 43 questions divided into five sections and allows calculation of two scores: a concussion knowledge index (CKI) and concussion attitude index (CAI). The CKI contains 17 basic true/false questions in section 1, three applied true/false questions in section 2, and recognition of eight common concussion symptoms (with eight non-scored distractors) in section 5, for a total score possible of 0-29 with a higher score representing greater concussion knowledge. The list of 16 symptoms was revised using a study by Williams, Langdon, McMillan and Buckley (2015), to create the most plausible set of items to choose from. The CAI contains 15 Likert-scale questions (1-5) in sections 3 and 4, where participants received a score of 1-5, with 5 being the safer answer and 1 being the least safe, for a potential range of 15-75. The RoCKAS-ST has been shown to be both valid and reliable (Rosenbaum & Arnett, 2010; Williams et al., 2015; Kroshus, Baugh, Hawrilenko & Daneshvar, 2015). Prior to participating in the educational seminar (Appendix E) participants completed a demographic questionnaire which provided information about their role with the team (coach, assistant coach, manager, trainer, parent), coaching courses completed and when, hockey trainer courses completed and when, years of coaching, and personal experience of concussion.

Once the RoCKAS-ST had been administered, participants took part in the concussion educational seminar that took one of three forms. Each of the three groups (one from Ancaster minor hockey, two from Flamborough minor hockey) received a different, randomly assigned, experimental treatment:

1. questionnaire – video – questionnaire
2. questionnaire – athlete's story – questionnaire
3. questionnaire – video + athlete's story - questionnaire

The video that was used was developed by Dr. Mike Evans and other concussion clinicians and educators (https://youtu.be/_55YmblG9YM) and is readily available on YouTube. The athlete's story was my own presentation intertwined with my personal history. My presentation was a brief history of my concussions and the symptoms I experienced, connecting my experiences with concussions to returning-

to-learn and returning-to-play, and the long-term effects I am still experiencing today. I addressed the lack of knowledge on concussion during my hockey career, and the things my family and I would have changed if I were to go back and do it all again. I believed my history with concussions at the high-school and post-secondary age would help to make clear the seriousness of this injury, and potential long-term effects when not managed properly. My story was pre-recorded and presented in video format to ensure consistency of delivery to both groups. Following the completion of the education session, participants completed the RoCKAS-ST questionnaire again. Questionnaires were organized with a participant ID number, rather than names, so that data were anonymous.

**Data Analysis.**

Data were recorded and analyzed in Microsoft Excel (Microsoft, Redmond, WA, USA). Additional analysis was done in IBM SPSS Statistics 24 (IBM Corp. Armonk, NY, USA). Answers for each question of the ROCKAS-ST were scored and totals for CKI and CAI, as well as overall total score, were determined. Analysis of variance (ANOVA) was used to examine changes in concussion knowledge, attitude toward concussion and symptom recognition, pre- and post-information session for each of the experimental conditions. Significance was set at $p \leq 0.05$.

## Part 2 Qualitative

### Methodology.

I employed a descriptive/interpretive qualitative approach to Part 2 of my study. Qualitative research of this type assumes a constructivist relationship with knowledge production, relying on the researcher's engagement with her research question, her informants, her data sets and her data analysis strategies to guide insight into, and knowledge translation of, the generative patterns and themes. In this way, knowledge about the question being explored is constructed from iterative, recursive and reflective engagement with the information rich data sets as well as from the multiple locations and perspectives of those who generated those data sets (Savin-Baden & Major, 2003). For this study, the data set was the conference materials from the 4th International Concussion Summit hosted by the District School Board of Niagara (DSBN), in partnership with the Ontario Ministry of Education, and OPHEA, so there was no direct contact with conference organizers, presenters or attendees. This allowed me to work unobtrusively on a rich data set that was constructed with multiple perspectives in mind—those of the organizers, the presenters, and the attendees.

### Data Set.

The 4th International Concussion Summit included keynote speakers, and breakout sessions directed towards teachers in the DSBN, although the conference was also open to the public. Conference materials for participants included a program (http://www.icsniagara.com/) that lists the keynote speakers with a description of their research or interest in the field of concussion. There was also a list of the breakout sessions (http://www.icsniagara.com/document/2016BreakoutSessions.pdf) that included a variety of speakers including physiotherapists, researchers, and program coordinators, all discussing various aspects of concussion and concussion management. The content of the description of the breakout sessions, as well as the discursive structures within those descriptions (e.g. jargon, technical language, disciplinary specific language) are included as part of the data set. The material presented in many of these sessions was targeted towards teachers, high school coaches, and administrators.

Examining the descriptions allowed me to gain insight into assumptions about, and strategies for, what might attract which type of professional.

**Data Analysis.**

I undertook both content and thematic analysis using manifest and latent strategies to analyze the unobtrusive data set obtained from the conference; using on-paper summaries of the keynote speakers and breakout sessions. Content analysis is a process of examining a data set at its most fundamental level; it is a description of the frequency and patterns of use of terms or phrases, as well as other visible characteristics (e.g. images, description lengths) (Savin-Baden & Major, 2003). Thematic analysis is a method of identifying, analyzing, and reporting patterns within the data (Savin-Baden & Major, 2003). Manifest content is explicit; if the data set involves text, the manifest content consists of the actual words, font size, and so on. Latent content is implicit; it is the content that is often implied, but not present in the text or images. Latent analysis is also guided by the theoretical and conceptual frameworks of the study (Van den Hoonaard, 2012).

An example of the analysis I underwent, when looking at a list of speakers for the conference, there are keynote speakers and breakout session speakers. Each keynote speaker was given an individual time to speak to all conference attendees, whereas the breakout session speakers had a shared time with three other speakers in separate rooms. This observation is an example of manifest content because it is explicit in the program notes. From this, it can be implied that the keynote speakers hold more cognitive authority than the presenters of the breakout sessions, and they are important for everyone to hear. The breakout session speakers were competing against other speakers, implying that they may be less important than the keynotes or that they will attract those whose interest most closely resonates with the topic. This interpretation is an example of latent analysis of the manifest content.

See Appendix F for a guide to manifest analysis of content for this study.

## Theoretical Perspectives.

### *Critical Disabilities Studies.*

According to Vehmas and Watson (2014), the aim of critical disabilities studies (CDS) is to help deconstruct ideas about disability. It is about shaking up some of our assumptions about disability. Concussion is a temporary disability which has the potential to become a long-term chronic disability if it is not treated and taken seriously. Therefore, I have chosen to use critical disabilities studies as my theoretical framework. There is a stigma attached to concussion in both school and sport, which is something we, as sport and movement professionals, need to address and change. Titchkosky and Michalko (2009), two Canadian CDS scholars, identify the interrogation and critique of normalcy as another key aim of CDS. Like other contemporary CDS scholars (e.g., Davis, 2013; Cameron, 2014; Goodley, 2016) Titchkosky and Michalko advocate for a clear distinction between the study of disability from primarily medical, rehabilitative and non-consultative (that is, missing the consultation with participants who identify as disabled as equal participants in the design and conduct of the research) models of research and Disability Studies, which places disability experience at the center and insists on insiders' experience as holding a dominant role in the decision and conduct of the research. My experience as a former hockey player, who now manages a significant post-concussion syndrome places me in a uniquely qualified position as an insider. Making normalcy the object of study allows scholars, who themselves identify as disabled, to demonstrate how normalcy is invisible in its operational applications and pervasiveness, thus giving it a position as the 'natural starting point' of most research while remaining unaccountable and unquestioned as an ideological position. Further, examining normalcy and deconstructing ideas and assumptions about disability allows CDS to elaborate on issues relating to the social construction of disability and the barriers to its deconstruction.

## Conceptual Frameworks.

### *Cognitive and Social Authority of Medicine and other professions.*

The cognitive and social authority of medicine, as described by Susan Wendell (1996), is a concept used to describe how various sectors of our society have the power to describe our bodily experiences and validate/invalidate them, and how various sectors of our society support or fail to support our bodily sufferings and struggles. It should also be noted that although cognitive and social authority of medicine affects everyone, its consequences are compounded for people who are treated as though they are without such authority (e.g. children and youth who are injured or disabled, vulnerable disabled adults). Physicians and researchers are seen as being high in cognitive authority since they are assumed to be in a 'mastery' relationship with difficult subject matter. Physicians also have social authority deriving from their cognitive authority and can have their opinions taken seriously whether they are speaking about their specialty area or not. Some researchers are also granted social authority, but only insofar as they are seen to be relevant and 'plugged in' to social issues. Social authority can also grant people a cognitive expertise that they may not necessarily have but are assumed to have because of the life experience that granted them their social authority. Wendell (1996) suggests that consequences accrue because of how and when cognitive and social authority are deployed by physicians and other professionals seen as having cognitive and/or social authority. These consequences include alienation, social abandonment, epistemic invalidation (i.e. ones knowledge of themselves and experiences is being dismissed, so the invalidation has a cascade effect into other dimensions of life) and failures of communication and gaps in knowledge.

The individual best positioned to deliver concussion information to coaches, teachers, and athletes will have enough cognitive and social authority to be taken seriously by the receiving audience. Who needs to deliver concussion information to athletes? The coach may have more social authority for the athlete than the parent and the teacher. Peers may have social authority and may also have the capability of influencing the consequences of alienation, epistemic invalidation and social abandonment.

If an athlete is unable to return to play, teammates may abandon or stigmatize that teammate; this further enforces alienation, which often leads back to returning too early. This concept was applied, in conjunction with Hall's encoding and decoding model, in the latent analysis of the unobtrusive data set.

### *Encoding and decoding model.*

Stuart Hall (1980) proposed an 'encoding-decoding' framework for analyzing audience readings of media content. The key assumption underlying the model was that audience interpretations, or 'readings' of media contents fall into three broad categories: the preferred reading, which is the reading that the media producer intended for the audience when assembling the media content; the negotiated reading, which is a reading connected to the preferred reading, but with some notable (but not oppositional) variations; and the oppositional reading, which is in direct contrast to the message intended by the producer of the media content. Hall's model is undergirded by Stanley Fish's (1979) concept of an 'interpretive community', that is, a community of people disposed to agree on interpretations of given media content and to influence each other in terms of how one interprets given media content. Using this conceptual framework allowed me to examine data sets and explore how my concussion education sessions were intended for various interpretive communities and were interpreted by various interpretive communities (e.g. coaches, teachers, parents) and how the concussion conference materials were intended for and might be interpreted by various audiences.

## Trustworthiness in Qualitative Research.

Along with the ethical considerations, researchers must also consider how they would approach the research process in a trustworthy manner. According to Lincoln and Guba (1985), the criteria for assessing trustworthiness are credibility, transferability, dependability, and confirmability. Credibility refers to whether the research findings represent a "credible" theoretical interpretation of the data drawn from the participants' original data, that is, the 'believability" of the findings. Credibility is improved through using verbatim transcripts, checking with informants, re-reading the data sets and providing clear

descriptions of all steps of the analysis process along with examples of each step from the raw data. Using the language of the participants also increases credibility. Transferability refers to the degree to which the findings of an inquiry can pertain or transfer beyond the boundaries of the project. This is a practical question that cannot be answered by the researcher alone. Readers of the project, other than the researcher, make the determination about its transferability. Readers will be helped in a decision about transferability if they have access to the steps taken by the researcher and a rich description of all the processes involved in the inquiry. Also helpful will be a rich description of the informants and their contexts so that other readers can decide if the participants and contexts are similar to their own, and whether the findings might be transferred to their own contexts. Again, the more transparent and robust the description of informants, contexts and research processes, the more likely it will be that the findings will be useful in other contexts. Dependability refers to the inquiry's strengths in internal design that allow readers to be confident that enough cross comparison mechanisms in data collection and data analyses were employed. Thus, the findings can be seen to be derived inductively from the informants' original data sets and deductively from engagement with sensitizing concepts from the literature and theoretical frameworks as opposed to being based in the researcher's foregone assumptions about the question under study. Triangulation of data collection and/or levels of data analyses and providing a research audit in the form of an ongoing researcher's journal, contribute to dependability, the ability to depend on the findings being derived from a rigorous process of data collection and analysis. The more clearly these processes are described, the more dependable is the study and its findings. Confirmability refers to how well the inquiry's findings are supported by the data collected and analyzed. Using verbatim quotes, the language of the informants, and providing access to the processes of recursive reduction, either in the body of the work or in appendices, adds to the confirmability. Researchers who employ all or most of these practices will likely create trustworthy studies.

## Chapter IV Results

### Part 1 Quantitative

Some characteristics of participants are shown in Table 3.

Table 3 Participant demographics

| | Number | Years in hockey (m ± SD) | Range (yr.) |
|---|---|---|---|
| Video | | | |
| Male | 3 | 12.8 ± 7.56 | 5 - 26 |
| Female | 6 | | |
| Athlete's story | | | |
| Male | 2 | 16.6 ± 11.59 | 8 - 42 |
| Female | 6 | | |
| Video + story | | | |
| Male | 4 | 27.4 ± 19.46 | 5 - 51 |
| Female | 5 | | |

Note: Participants may have identified as a coach, trainer and parent, if they had the required courses completed for each.

Personal experience with concussion varied from no experience to both personal experience with a concussion and children experiencing a concussion. Reported comments such as "daughter believes to have had at least one concussion that was treated, possibly others not investigated due to not being voluntary about symptoms," raise concern for players' safety while participating in hockey. One parent identified their lack of knowledge in the symptoms of a concussion as a reason why their child was never properly diagnosed. A few participants reported that they or their child had received multiple concussions.

All participants completed the RoCKAS survey before and after the experimental treatments, and all passed the validity index (pre: mean = 2.88 ± 0.33, range = 2-3, post: mean = 2.92 ± 0.27, range = 2-3) and were included in the analysis of results. Two participants failed to answer one question each and these values were estimated using the Missing Values algorithm in SPSS. Cronbach's alpha analysis for internal consistency of the Likert-scale sections (CAI) produced acceptable values of 0.701 (pre-treatment survey) and 0.694 (post-treatment survey). Analysis of variance (ANOVA) revealed that there were no

significant differences in CKI and CAI scores between the groups before the concussion information was presented, suggesting that the groups were similar. There were no significant differences in CKI and CAI scores between the groups after participants were given the concussion information (Table 4).

Table 4. CKI (0 – 25) and CAI (0 – 75) scores pre- and post-experimental treatment.

| Score (m ± SD) | Video | Athlete's Story | Video + Story |
|---|---|---|---|
| CKI pre | 20.56 ± 1.59 | 20.63 ± 1.19 | 19.44 ± 2.19 |
| CKI post | 20.11 ± 1.69 | 20.75 ± 1.49 | 20.56 ± 1.42 |
| CAI pre | 66.56 ± 5.25 | 64.25 ± 6.02 | 67.00 ± 5.10 |
| CAI post | 67.00 ± 5.68 | 65.85 ± 6.71 | 67.00 ± 4.12 |
| Total pre | 87.11 ± 5.46 | 84.87 ± 6.17 | 86.44 ± 5.22 |
| Total post | 87.11 ± 6.85 | 86.60 ± 6.76 | 87.56 ± 4.16 |

The most commonly chosen correct answers in the CKI pre-test were: symptoms of a concussion can last several weeks (100%), concussions can sometimes lead to emotional disruptions (100%), and in order to be diagnosed with a concussion you have to be knocked out (100%). All participants answered the first two questions as true, and the third one as false. The most commonly chosen incorrect answers were: after 10 days, symptoms of a concussion are usually completely gone (15.4%), an athlete who gets knocked out after getting a concussion is experiencing a coma (7.7%), and after a concussion occurs, brain imaging (e.g., CAT Scan, MRI, X-Ray, etc.) typically shows visible physical damage (e.g., bruise, blood clot) to the brain (46.2%). The majority of participants marked the first question as false which is incorrect, and the second question as false which is incorrect. About half of the participants marked the third question as true which is incorrect.

In the post-test CKI, all participants correctly identified again that symptoms of a concussions can last several weeks and in order to be diagnosed with a concussion, you have to be knocked out, while one participant changed their answer for concussions can sometimes lead to emotional disruptions (96.2%). In the post-test, participants answered the same for an athlete who gets knocked out after getting a concussion is experiencing a coma (7.7%), two participants changed their answer for after 10 days,

symptoms of a concussion are usually completely gone (23.1%), and 10 participants changed their answer for after a concussion occurs, brain imaging (e.g., CAT Scan, MRI, X-Ray, etc.) typically shows visible physical damage (e.g., bruise, blood clot) to the brain (84.6%). Pre- and post-test CKI scores are shown in Table 5.

Table 5 Pre- and post-test CKI scores.

| Question | Pre-Test True (%) | Pre-Test False (%) | Post-Test True (%) | Post-Test False (%) |
|---|---|---|---|---|
| Section 1 | | | | |
| 1. There is a possible risk of death if a second concussion occurs before the first one has healed. | **65.4** | 34.6 | **57.7** | 42.3 |
| 3. People who had one concussion are more likely to have another concussion. | **84.6** | 15.4 | **80.8** | 19.2 |
| 5. In order to be diagnosed with a concussion, you have to be knocked out. | 0 | **100** | 0 | **100** |
| 6. A concussion can only occur if there is a direct hit to the head. | 19.2 | **80.8** | 23.1 | **76.9** |
| 7. Being knocked unconscious always causes permanent damage to the brain. | 3.8 | **96.2** | 11.5 | **88.5** |
| 8. Symptoms of a concussion can last several weeks. | **100** | 0 | **100** | 0 |
| 9. Sometimes a second concussion can help a person remember things that were forgotten after the first. | 7.7 | **92.3** | 7.7 | **92.3** |
| 11. After a concussion occurs, brain imaging (e.g., CAT Scan, MRI, X-Ray, etc.) typically shows visible physical damage (e.g., bruise, blood clot) to the brain. | 53.8 | **46.2** | 15.4 | **84.6** |
| 12. If you receive one concussion and you have never had a concussion before, you will become less intelligent. | 11.5 | **88.5** | 7.7 | **92.3** |
| 13. After 10 days, symptoms of a concussion are usually completely gone. | **15.4** | 84.6 | **23.1** | 76.9 |
| 14. After a concussion, people can forget who they are and not recognize others but be perfect in every other way. | 46.2 | **53.8** | 61.5 | **38.5** |
| 16. Concussions can sometimes lead to emotional disruptions. | **100** | 0 | **96.2** | 3.8 |
| 17. An athlete who gets knocked out after getting a concussion is experiencing a coma. | **7.7** | 92.3 | **7.7** | 92.3 |
| 18. There is rarely a risk to long-term health and well-being from multiple concussions. | 0 | **100** | 7.7 | **92.3** |
| Section 2 | | | | |
| 1. It is likely that Player Q's concussion will affect his long-term health and well-being. | 7.7 | **92.3** | 15.4 | **84.6** |
| 2. It is likely that Player X's concussion will affect his long-term health and well-being. | **84.6** | 15.4 | **76.9** | 23.1 |
| 3. Even though Player F is still experiencing the effects of the concussion, her performance will be the same as it would be had she not suffered a concussion. | 3.8 | **96.2** | 3.8 | **96.2** |

Note: Pre- and post-CKI scores. The correct answer is bolded

Attitudes about concussion were assessed in the CAI section of the RoCKAS survey. Pre-test scores are shown in Table 6 and post-test scores are shown in Table 7. The 'safer' responses to each question are highlighted in bold. In pre-test attitude scores, the most commonly chosen safest answers were: I feel that an athlete has a responsibility to return to a game even if it means playing while still experiencing symptoms of a concussion (safe answer: strongly disagree – 88.5%, disagree – 11.5%), I feel that Coach A made the right decision to keep Player R out of the game (safe answer: strongly agree – 88.5%, agree – 11.5%), and I feel that Athlete H should tell his coach about the symptoms (safe answer: strongly agree – 88.5%, agree – 11.5%). The most commonly chosen incorrect answer in the pre-test attitude questions were: most athletes would feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play (safe answer: strongly agree – 19.2%, agree – 46.2%), most athletes feel that Athlete O should have returned to play during the semifinal playoff game (safe answer: strongly disagree – 26.9%, disagree – 30.8%).

Table 6 Pre-test CAI scores (SD = strongly disagree; D = disagree; N = neutral; A = agree; SA = strongly agree.)

| | Pre-Test | | | | |
|---|---|---|---|---|---|
| **Question** | **SD** | **D** | **N** | **A** | **SA** |
| Section 3 | | | | | |
| 1. I would continue playing a sport while also having a headache that resulted from a minor concussion. | **65.4** | **19.2** | 7.7 | 3.8 | 3.8 |
| 2. I feel that coaches need to be extremely cautious when determining whether an athlete should return to play. | 0 | 0 | 0 | **15.4** | **84.6** |
| 5. I feel that concussions are less important than other injuries. | **80.8** | **19.2** | 0 | 0 | 0 |
| 6. I feel that an athlete has a responsibility to return to a game even if it means playing while still experiencing symptoms of a concussion. | **88.5** | **11.5** | 0 | 0 | 0 |
| 7. I feel that an athlete who is knocked unconscious should be taken to the emergency room. | 0 | 3.8 | 3.8 | **11.5** | **80.8** |
| Section 4 | | | | | |
| 1. I feel that Coach A made the right decision to keep Player R out of the game. | 0 | 0 | 0 | **11.5** | **88.5** |
| 2. Most athletes would feel that Coach A made the right decision to keep Player R out of the game. | 0 | 15.4 | 15.4 | **30.8** | **38.5** |
| 3. I feel that Athlete M should have returned to play during the first game of the season. | **76.9** | **19.2** | 3.8 | 0 | 0 |
| 4. Most athletes would feel that Athlete M should have returned to play during the first game of the season. | **26.9** | **53.8** | 3.8 | 15.4 | 0 |
| 5. I feel that Athlete O should have returned to play during the semifinal game. | **uu** | **19.2** | 3.8 | 0 | 0 |
| 6. Most athletes feel that Athlete O should have returned to play during the semifinal playoff game. | **26.9** | **30.8** | 15.4 | 26.9 | 0 |
| 7.I feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. | 3.8 | 7.7 | 0 | **34.6** | **53.8** |
| 8. Most athletes would feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. | 3.8 | 15.4 | 11.5 | **46.2** | **19.2** |
| 9. I feel that Athlete H should tell his coach about the symptoms. | 0 | 0 | 0 | **11.5** | **88.5** |
| 10. Most athletes would feel that Athlete H should tell his coach about the symptoms. | 0 | 19.2 | 11.5 | **38.5** | **30.8** |

Note: Percentages (%) provided are based on each participant receiving 1-5 points depending on their answer with 5 points given for the safest answer and 1 point representing the least safe answer.

The most commonly chosen safest answers were: I feel that coaches need to be extremely cautious when determining whether an athlete should return to play (safe answer: strongly agree – 92.3%,

agree – 3.8%), I feel that an athlete has a responsibility to return to a game even if it means playing while still experiencing symptoms of a concussion (safe answer: strongly disagree – 92.3%, disagree – 7.7%), and I feel that Coach A made the right decision to keep Player R out of the game (safe answer: strongly agree – 88.5%, agree – 11.5%). The most commonly chosen incorrect responses were: I feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play (safe answer: strongly agree – 65.4%, agree – 15.4%), most athletes feel that Athlete O should have returned to play during the semifinal playoff game (safe answer: strongly disagree – 34.6%, disagree – 34.6%), and most athletes would feel that Coach A made the right decision to keep Player R out of the game (safe answer: strongly agree – 38.5%, agree – 30.8%).

Table 7 Post-test CAI scores (SD = strongly disagree; D = disagree; N = neutral; A = agree; SA = strongly agree).
Start

| | Post-Test | | | | |
|---|---|---|---|---|---|
| **Question** | **SD** | **D** | **N** | **A** | **SA** |
| Section 3 | | | | | |
| 1. I would continue playing a sport while also having a headache that resulted from a minor concussion. | **76.9** | **15.4** | 3.8 | 0 | 0 |
| 2. I feel that coaches need to be extremely cautious when determining whether an athlete should return to play. | 0 | 3.8 | 0 | **3.8** | **92.3** |
| 5. I feel that concussions are less important than other injuries. | **76.9** | **23.1** | 0 | 0 | 0 |
| 6. I feel that an athlete has a responsibility to return to a game even if it means playing while still experiencing symptoms of a concussion. | **92.3** | **7.7** | 0 | 0 | 0 |
| 7. I feel that an athlete who is knocked unconscious should be taken to the emergency room. | 3.8 | 0 | 11.5 | **19.2** | **65.4** |
| Section 4 | | | | | |
| 1. I feel that Coach A made the right decision to keep Player R out of the game. | 0 | 0 | 0 | **11.5** | **88.5** |
| 2. Most athletes would feel that Coach A made the right decision to keep Player R out of the game. | 0 | 23.1 | 7.7 | **30.8** | **38.5** |
| 3. I feel that Athlete M should have returned to play during the first game of the season. | **84.6** | **15.4** | 0 | 0 | 0 |
| 4. Most athletes would feel that Athlete M should have returned to play during the first game of the season. | **34.6** | **50.0** | 3.8 | 11.5 | 0 |
| 5. I feel that Athlete O should have returned to play during the semifinal game. | **84.6** | **15.4** | 0 | 0 | 0 |
| 6. Most athletes feel that Athlete O should have returned to play during the semifinal playoff game. | **34.6** | **34.6** | 7.7 | 23.1 | 0 |
| 7.I feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. | 7.7 | 7.7 | 3.8 | **15.4** | **65.4** |
| 8. Most athletes would feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. | 3.8 | 7.7 | 23.1 | **38.5** | **26.9** |
| 9. I feel that Athlete H should tell his coach about the symptoms. | 0 | 0 | 0 | **15.4** | **84.6** |
| 10. Most athletes would feel that Athlete H should tell his coach about the symptoms. | 0 | 15.4 | 15.4 | **38.5** | **30.8** |

Note: Note: Percentages (%) provided are based on each participant receiving 1-5 points depending on their answer with 5 points given for the safest answer and 1 point representing the least safe answer.

The mean pre-test score for identifying the correct symptoms was 7.15 out of 8, and the mean post-test score for identifying the correct symptoms was 7.58 out of 8. The most frequently identified correct symptoms in the pre-test were headache, nausea, and dizziness, and the most frequently identified incorrect symptoms were amnesia, and loss of consciousness. In the post-test, there were only three correct symptoms that did not receive a score of 100%; sleep disturbances, amnesia, and loss of consciousness. The incorrect symptoms that were most frequently identified in both the pre-test and post-test were black eye and chest pain.

Table 8 shows correct and incorrect symptom scores.

| **Correct Symptom** | **Pre-test (n = 26)** | **Post-test (n = 26)** |
|---|---|---|
| Blurred Vision | 88.5 | 100.0 |
| Confusion | 96.2 | 100.0 |
| Headache | 100.0 | 100.0 |
| Nausea | 100.0 | 100.0 |
| Sleep Disturbances | 88.5 | 96.1 |
| Amnesia | 69.2 | 80.8 |
| Dizziness | 100.0 | 100.0 |
| Loss of Consciousness | 73.1 | 80.8 |
| | | |
| **Incorrect Symptom** | | |
| Abnormal Sense of Smell | 61.6 | 65.4 |
| Black Eye | 88.5 | 92.3 |
| Numbness/Tingling | 76.9 | 65.4 |
| Abnormal Sense of Taste | 61.6 | 69.2 |
| Chest Pain | 96.2 | 92.3 |
| Nosebleed | 76.9 | 80.8 |
| Sharp Burning Pain | 65.4 | 69.2 |
| Weakness in Neck | 57.7 | 61.6 |

Note: The percentage (%) of respondents who identified each symptom.

**Part 2 Qualitative Results**

I undertook a three-stage analysis of unobtrusive data set obtained from the 4th International Concussion Summit. First, I conducted a content and thematic analysis using manifest strategies. Next, I did latent analysis of the manifest content which included plausible interpretations framed by Wendell's (1996) cognitive and social authority of medicine, and possible questions to be considered by the conference committee. Lastly, I used Hall's 'encoding-decoding' framework to analyze the different readings from the latent analysis, for example, the congruent, congruent with variation, and reverse readings.

**Manifest Analysis – Keynote Speakers.**

The manifest analysis consisted of identifying all aspects (e.g. description lengths, pictures) for the program handed out to all participants at the conference. Each page was broken down into number of lines, content of the words, description of pictures and/or logos, and colour of the letters. Once I completely analyzed the pages, I found that some presenters had to share a page, while others received their own page.

Table 9 shows Keynote Speakers Description Lengths

| Keynote Speaker | Full/Shared Page | Length of Description |
|---|---|---|
| Warren Hoshizaki | Full page | 28 lines |
| Dr. Charles Tator | Full page | 25 lines |
| Dr. T. Blaine Hoshizaki | Full page | 35 lines |
| Dr. Roger Zemek | Shared page | 14 lines |
| Dr. Patrick J. Bishop | Full page split between 2 pages | 15 lines |
| Dr. Gerard Gioia | Shared page | 15 lines |
| Hon. Liz Sandals | Full page | 30 lines |
| Thurman Thomas | Full page | 36 lines |

The keynote speakers were placed in the program in the order that they were presenting at the conference, which is the same order as listed above. The theme of the conference;, Protection, Protocol,

and Partnership, seems to be of equal importance among the keynote speakers since each theme is represented by three different speakers. The lettering and logos on each page were consistent throughout the pages in the program that were assigned to keynote speakers with respect to size and colour. There was variation in the pictures provided of each keynote speaker, in their attire and the location of the picture being taken.

Table 10 shows Keynote Speakers' Picture Description.

| Speaker | Attire | Background |
|---|---|---|
| Warren Hoshizaki | Dress shirt, tie | Neutral |
| Dr. Charles Tator | Dress shirt, tie | Institutional |
| Dr. T. Blaine Hoshizaki | Dress shirt, tie | Neutral |
| Dr. Roger Zemek | Stethoscope, tie, name identifier | Hospital |
| Dr. Patrick J. Bishop | Open collared shirt | Neutral |
| Dr. Gerald Gioia | Dress shirt, tie | Sitting in office |
| Hon. Liz Sandals | Blazar, scarf (business casual) | Neutral – professionally done photo |
| Thurman Thomas | Shirt and jacket | Neutral |

*Neutral – not located anywhere specific, no indicators of where the photo was taken

**Manifest Analysis – Breakout Sessions.**

The pages in the program for the breakout speakers are split into two columns and have three entries per page. They are listed by alphabetic queuing, that's inconsistently applied from one session to the next (e.g. Session B – a researcher on day 1, and an executive director and advocacy specialist on day 2). The theme of the conference is not represented equally throughout the breakout sessions. Protection seems to be of higher importance in the breakout sessions based on the number of presentations available during each session, whereas protocol seems to be of the least importance.

There was a total of 14 breakout session presenters, all but four were given two time slots to present (one in the first session of the day, one in the second). The four that were not given a second time-slot were: LifeMark Health clinicians, Brock University researchers, University of Ottawa researchers, and administrators from District School Board of Niagara.

When looking at the topics presented in the breakout sessions, school vs. sport, they seem to be equally represented. Participants were not required to attend anything specific and could attend anything they wanted. Three sessions presented school-specific material related to concussion, three presented sport-specific material related to concussion, three presented both school- and sport-related material, and five of the sessions weren't specific in their descriptions.

**Latent Analysis.**

The second layer of my analysis consisted of making plausible interpretations of my manifest analysis from both the keynote speakers and breakout sessions.

When examining the space allotted in the program to each of the keynote speakers, this doesn't seem to reflect academic credentials, but rather social and/or cognitive authority at the conference. Dr. Pat Bishop might be seen has having less status due to sharing a page in the program and being placed as the last speaker on the first full day of the conference. This placement in the schedule could also reflect Dr. Bishop having high social and/or cognitive authority, being used to encourage participants to stay at the conference for the full duration of the day. Former NFL player, Thurman Thomas, was placed last among speakers at the conference, but had the longest description in the program. Based on cultural capital, value based on status and celebrity Thomas has the most credibility and is more well-known to conference goers, even though he is not as creditable as other speakers in terms of concussion knowledge. Dr. Charles Tator and Dr. Gerard Gioia hold high cognitive authority due to their academic/professional qualifications, which is shown by being the first presenters of each day, although Dr. Tator has his own page in the program, and Dr. Gioia shares a page. Hon. Liz Sandals holds high cognitive authority at the conference due to her position of Minister of Education which is implied by having her own page for her description and being the second presenter on the second day of the conference. Dr. Blaine Hoshizaki is the second presenter on the first day and has his own page in the program implying the high status that he holds at the conference, which may be partly due to his relationship to the chair of the DSBN.

The attire and background of the keynote speakers' pictures were analyzed for cognitive and social authority markers which identified individuals who seem to hold either high social and/or cognitive authority at the conference. For example, Dr. Zemek, who is pictured wearing a stethoscope, tie and name identifier with a hospital background, may be seen as having high medical cognitive authority due to his identifiers. Dr. Gioia is wearing a tie and sitting in an office which is also showing more iconic status imagery. Thurman Thomas is wearing a shirt and jacket with a neutral background, meaning he wasn't located anywhere specific – there are no indicators of where the photo was taken.

Throughout my manifest and latent analysis some questions arose; how much cross cohort interaction is there at a conference? How might we get a sense of this? Is there a way to track it? Could keynotes be a panel rather than individual speakers? A panel of researcher, parent, and coach to demonstrate networking would force intelligibility of technical discourse making the transfer of information to conference participants more understood.

**Encoding and Decoding Model.**

The encoding and decoding model (Hall, 1980) was used to analyze different parts of the conference brochure: keynote speaker images, keynote speaker scheduling, description lengths of all presenters, and breakout session repetition. This model has three reader interpretations of the content which include: congruent: i.e. the intended message for the audience, congruent with variation: i.e. the message connected to the intended message but with variation, and reverse: i.e. the message is in direct contrast to the intended message.

**Keynote Speakers.**

Table 11 shows application of the Hall model to Keynote Speakers

| | Congruent | Congruent with variation | Reverse of what is expected |
|---|---|---|---|
| Images – lab coat and stethoscope, Caucasian<br>Dr. Roger Zemek | Looks sophisticated and holds high cognitive authority. | He looks professional so I'm going to attend. Looks like a doctor but not sure how much he knows specifically on concussions. | Put off by the repeating importance of being a doctor. |
| Images – wearing a dress shirt with no tie and a blazer, black<br>Thurman Thomas | Dressed professionally, looks pleasant, can speak with the public. | I see that he is a professional, not an athlete, but he has enough credentials to get me there. | Where's the football jersey? I expected to see an athlete not a business man. Racism – nothing to share with me. |
| Images – wearing a dress shirt with no tie and a blazer | Dressed professionally, looks like he is still a current academic, holds high cognitive authority and attire supports this. Would not be the broad audience attracter. | He's current with experience and looks like he could be similar to the others, maybe he will give me information that is more academic than the first guy. | Another white man talking about science, don't need to attend. |
| Images – scarf, business casual, female<br>Hon. Liz Sandals | Dressed business casual appropriate for this conference, aiming for a broad audience. Knows how to dress for the people she's addressing. | Older woman and has got experience. | She's the token woman of the conference, I don't need to go. |
| Images – wearing a shirt, more casual<br>Dr. Patrick J. Bishop | Dressed more casually, can speak more my language. | Probably a retired professor so he has expertise but perhaps not currency. | Doesn't give me a lot of confidence in his status. |
| Scheduling – single presentations of the keynotes | Able to make it to all the keynote speakers – they must be important to hear, where they're placed is based on high cognitive or social authority. | Timing not good, end of day and I'm leaving. | Able to make it to all the keynotes, but not sure how many will apply to my practice (i.e. coach, teacher, parent). Brains up front and real people at the end, I'm ticked off so I'm not going. |

| | | | |
|---|---|---|---|
| Program description lengths | Description is going to want to get you there regardless of the scheduling. Has many credentials listed speaking to his cultural capital. | Glad to have all this information, but knowing they are a keynote and are important to see I'm still going to go. May learn something new about the person to persuade you to go. | None of these credentials are related to concussions, it's just the speaker boasting about himself. Description is too long, trying too hard. |

Table 12 shows Application of Hall to Breakout Sessions

| | **Congruent** | **Congruent with variation** | **Reverse of what is expected** |
|---|---|---|---|
| Concurrency and repetition | Forced choices – flipped between the two. | I'm into my forced choice but I can't get to all strands. | I'm not happy being with all the same people as I usually am. |
| Repetition | Highly desired but forced choices, the repetition gives me an opportunity to see both speakers I'd like. | Forced choices and I'm able to see two that I'd like but there is a third I wanted to see. | I think all the speakers would be interesting to hear and I'm not happy about having to pick two out of six. |

## CHAPTER V – DISCUSSION

### Part I Quantitative

There were no significant differences between treatment groups on pre- and post-questionnaires, therefore the participants were treated as one group in the data analysis. This may have been due to the high level of knowledge of participants in this study prior to these education sessions (average pre-test knowledge scores of 20.56 for the video group, 20.63 for the athlete's story group, and 19.44 for the video and athlete's story group, average post-test knowledge scores of 20.11, 20.75, and 20.56, respectively). Kerr (2016) found that youth football coaches had high knowledge and attitude scores after receiving required education through USA Football's Heads Up concussion education program. For participants in the present study, there seemed to be a ceiling effect in place, in that there was little room to improve their knowledge of concussion, no matter what method of instruction was used. Their level of knowledge may have been achieved through one of two coaching qualifications they received from NCCP under Hockey Canada, and training qualifications that were obtained through the OWHA, Ontario Minor Hockey Association (OMHA), and First Aid training. Although it has been reported in the past that the level of knowledge in community youth sport has been low, this does not seem to be the case with this population of participants (Bagley et al., 2012; Cavassin, Elbin, & Sarmieto, 2011). In this study, I found that coaches and parents have a high level of knowledge about concussion, but this level of knowledge does not correlate with their attitudes about concussion i.e., a high score on the CKI does not indicate a high CAI score.

In the present study, correlations between knowledge and attitude scores were not significant meaning that they were not statistically related. Chin and Porter (2016) conducted interviews with student-athletes from six different sports (i.e. football, men's soccer, women's soccer, women's volleyball, men's water polo, and women's water polo) who reported knowingly ignoring concussion-like symptoms to continue playing due to their sense of duty or commitment to their team. The athletes were able to identify their symptoms but deemed them to be 'minor' which highlights the disconnect between

knowledge and attitude on concussion. Echlin (2010) described a hockey player who knowingly continued to play through a concussion to please his teammates, as well as a coach who agreed to an independent evaluator to identify concussions during the regular season but withdrew from the study and rejected the evaluator for the playoffs. Although these athletes and coaches have the knowledge to be able to identify concussion-like symptoms during competition, appropriate steps to remove the athlete from competition don't happen until a medical evaluation has occurred.

One of the questions in the CKI is now somewhat outdated as new research about concussion has changed the evidence: "after 10 days, symptoms of a concussion are usually completely gone". Most participants (pre-test 84.6%, post-test 76.9%) responded that this statement was false, which was incorrect when using the marking key developed by Rosenbaum and Arnett in 2010. McCrory, et al. (2005) reported that most symptoms resolve within 7-10 days for a majority of individuals, but the recovery time may be longer in children and adolescents. More recently however, McCrory, et al. (2017) did not report any given timelines on return to play as there is not enough evidence to support any sort of timeline, and there are many other factors involved in a full recovery from concussion. Hutchinson, Comper, Csenge, and Richards (2014) concluded in their study on male high school athletes that the average recovery period to return to full activities was 38 days. The participants in the present study may have answered this question based on information that is readily available in the media that reports that symptoms may last between 7-10 days but could last for weeks and/or months (ThinkFirst). The wording in question 17 in section one seemed to cause confusion for the participants: "an athlete who gets knocked out after getting a concussion is experiencing a coma". Many participants may have chosen the incorrect answer of false (pre- and post-test 92.3%), based on their perception of a coma being a period of prolonged unconsciousness. Clinically, however, 'coma', as assessed by the Glasgow Coma Scale subsection of the SCAT5 spans a range from no eye opening, verbal or motor response to being able to spontaneously open the eyes, being oriented to time, place and person, and obeying commands (Putukian, 2017).

In the pre- and post-test questionnaire, one item was among the most commonly chosen incorrect statements for both: "most athletes feel that Athlete O should have returned to play during the semifinal playoff game". This further supports the findings of Echlin et al. (2010), in that winning seems to be more important than the health of the athlete. Athletes who are playing through an injury for the good of the team are held in a higher regard than those who are unable to play due to injuries (Chin & Porter, 2016, Echlin, 2010). Concussions are an invisible injury making it harder for athletes to "prove" that they are injured.

Educational efforts are still needed in the game of hockey to help bridge the gap between knowledge about and attitudes toward concussion. Education needs to be an ongoing process for all persons involved in the game of hockey to push for a shift in attitudes towards concussions. The mindset that winning seems to be more important than the health of the athlete in the game of hockey is one of the main barriers to athletes, parents, and coaches treating concussions with the correct care needed.

## Part II Qualitative

### Manifest and Latent.

The reader will recall that in my analysis of conference materials, I examined the conference program using several categories (i.e. description length, images, theme).

When examining the page lengths of the keynote speakers' biographies, the length doesn't seem to reflect academic credentials, but rather reflects social and/or cognitive authority at the conference. Thurman Thomas, and Dr. Blaine Hoshizaki, both had the longest lengths, both held high social authority at the conference. Thurman Thomas was the "token athlete" who concluded the conference, and Dr. Blaine Hoshizaki is related to one of the conference hosts.

The attire and background of the keynote speakers' pictures were analyzed for cognitive and social authority markers which identified individuals who seem to hold either high social and/or cognitive authority at the conference. The speakers who were dressed in a lab coat with a dress shirt underneath and a stethoscope around their neck seem to hold high cognitive authority especially if the background looks like a hospital. Whereas the speakers with a dress shirt, no tie and a blazer may hold high social authority because they are well dressed and professional looking. If they aren't placed in a recognizable setting, then there are no indications of cognitive authority.

Throughout my manifest and latent analysis some questions arose: 1) How much cross cohort interaction is there at a conference? 2) How might we get a sense of this? 3) Is there a way to track it? 4) Could keynotes be a panel rather than individual speakers? Cross cohort interaction is referring to the opportunities given for researchers, doctors, teachers, coaches, and parents to interact and share information with one another. It is difficult to determine the level of cross cohort interaction, but at this conference there were not any forced settings for interaction in the brochure. Each participant had multiple choices for the breakout sessions, meaning not everyone was in attendance if discussions occurred at sessions. We may be able to get a sense of the amount cross cohort interaction by distributing a questionnaire to participants at the end of the conference. A panel of researcher, parent, and coach

which could be used to demonstrate networking, would force intelligibility of technical discourse making the transfer of information to conference participants more understandable. This would give participants an opportunity to ask questions and get a variety of perspectives on different issues around concussions. It not only gives them the medical perspective on the proper management steps, but also the personal experience from a parent's perspective to put it all into context. This conference is hosted by the DSBN to educate teachers, coaches, and parents; therefore, the discourse should be delivered in a manner that participants understand and can pass on to youth athletes.

**Hall and Audience Response Theory.**

Hall (1980) proposed a theory of audience response to marketing and other persuasive messaging: congruent, congruent with variation, and the reverse of what is expected. The reader will also remember Wendell's application of Addelson's concepts of cognitive and social authority, which is the concept used to describe how various sectors of our society have the power to describe our bodily experiences and validate/invalidate them.

The analysis showed that the format of the conference suggests that social authority comes first, and cognitive authority comes last, which does not reflect how our youth athletes should be treated with respect to school and sport. The RTL protocol should be carried out to completion before the RTP protocol starts, with exception of moderate activity which can be implemented if it doesn't provoke symptoms. Conference attendees may not feel that the research of the keynote presenters applied directly to them, and therefore may not have been happy with the layout of the conference. If informal discussion sessions had been built into the conference schedule, participants may have had the opportunity to connect with the keynote presenters to get a better understanding of their research.

The description of the keynote speakers in the program consisted of credentials and awards won, instead of the information that they would be presenting. If participants did not know who the presenter was, they may not have attended their session and missed out on valuable information.

Overall, this conference could be more effective if there was congruence between what the participants need and what the conference provides. The target audience is teachers, coaches, and parents who may have limited background knowledge on concussion, thus making it challenging to understand the more technical aspects of the information provided by the keynote speakers.

## Synergies

In this section I will describe the advantageous connections between the findings derived from my two forms of analysis, that is, how the findings might show reciprocal, or synergistic support for education regarding concussion. The quantitative and qualitative findings that will be used to make synergies are: a high level of CKI was still accompanied by many misconceptions as revealed by the CAI, there weren't any correlations between knowledge and attitude scores, and social authority seemed to be more important than cognitive authority in sport and education throughout the conference. Findings from the conference, that social authority seemed more important than cognitive authority, may relate to the quantitative study findings of disconnect between the CKI and CAI scores. Although there was a high level of concussion knowledge, there doesn't seem to be the same level of thinking in terms of attitudes towards concussion. The synergies between my quantitative and qualitative research questions will be discussed using Provvidenza and Johnson's (2009) five principles that need to be considered when developing an effective educational tool.

### Who is the target audience?

It is important to be specific when defining your target audience and to know their values, to help shape the message to their needs (Provvidenza & Johnston, 2009). The values of parents, coaches, managers and trainers may vary between male to female hockey as the rules of the game are different with no contact being allowed in women's hockey. My research was limited to coaches, trainers, managers and parents involved in women's hockey in Ontario which is important to note when creating an educational seminar on concussions. The people who need the education the most are parents, trainers, managers and coaches as they are an important piece of concussion prevention in hockey (Tator, 2013).

### What is the message being delivered?

Messages should be specific and tailored to the needs of the target audience and knowing the behavior that you want to change can help create the message to facilitate change (Provvidenza & Johnston, 2009). According to my research there is a disconnect between concussion knowledge and

attitudes towards concussion. The stigma is not assigned to concussion but rather to how long it takes to "get over it" (Morrow, and Wamsley, 2010). As reported by McCrory, et al. (2013), a concussion is typically a functional brain disturbance rather than a structural injury, meaning a concussion cannot be physically seen through structural neuroimaging. Teammates, coaches, and family members cannot "see" a concussion potentially making it more difficult for them to understand the individual's symptoms. The longer the symptoms last, the less understanding others are about it. As presented at the concussion conference, social authority was held in higher regard than cognitive authority, and this hierarchy is also present in the game of hockey. There was a high level of concussion knowledge within the coaches and parents that participated in the education seminars, but attitudes did not seem to reflect this. The gap between knowledge about and attitudes toward concussion is what needs to be addressed in concussion education.

**Who is delivering the message?**

Although there were no significant differences in effectiveness between my education seminars: 1) education video, 2) athlete's story, 3) education video and athlete's story, Hall can be applied to demonstrate that a broader audience will respond to a combined approach. If the participants have the reverse reaction to an education video (i.e. this doctor is being paid every time this video is shown, so why would I listen to them), then hopefully they have a congruent reaction to the athlete's story or coach depending on who the audience is. A reverse reaction can also happen for an athlete's story (i.e. just because it happened to you, doesn't mean it'll happen to me. I'll be fine) therefore the story accompanied with the video will hopefully educate the participants on the symptoms to look for and proper ways to manage a concussion. Is it going to take professional athletes' stories to help deliver the message in a manner that athletes, parents and coaches are going to respond? Daniel Carcillo, and Nick Boynton are NHL players that have recently spoken out about their battle with concussions from playing NHL hockey in The Players' Tribune (https://www.theplayerstribune.com/en-us). Although there are new research findings being published constantly, the myths and attitudes persist. Famous athletes are the only ones

cutting into the myths that are still present in the game of hockey. Scientific information is needed combined with people who are celebrities in the sport, as science isn't enough. A panel with high status and strong stories to support the science is recommended to reach a broader audience and deconstruct some of the social barriers built around the sport of hockey. This may be a step in the right direction in delivering the message about proper concussion management and following the RTL and RTP protocols.

**How the is the message being transferred?**

The size and nature of the audience, budget and availability of resources should be considered when determining the method of knowledge transfer (Provvidenza & Johnston, 2009). Conference organizers attempted to make the presentations of the keynote speakers available through online streaming, although the quality was poor. It was difficult to see the slides and hear clearly what the presenter was saying. The ballroom at the conference centre where the keynote speakers presented had a large screen showing the presenter's slides for participants to follow. The breakout sessions also had screens to present slides, and some included handouts while others did not.

**What is the impact of the knowledge transfer?**

Changes in knowledge, awareness or attitude should be assessed to determine if there is a change in decision making and behaviour (Provvidenza & Johnston, 2009). In each seminar, I assessed two components (CKI and CAI) to see the impact of the knowledge transfer in the different seminars. It would be interesting to work with the same group of participants over a longer period of time to continue assessing their knowledge and attitudes. I believe concussion education and awareness should be an ongoing process to make a difference in the game of hockey. As highlighted earlier in this chapter, the social authority surpassing cognitive authority puts more athletes at risk not only during a game but also from continuing to play through an injury, potentially leading to more serious injury.

**Conference Recommendations Based on Hall.**

Future recommendations for the International Concussion Summit hosted by the DSBN based on my findings from Hall include, but aren't limited to, avoiding tokenism (i.e. not having just one woman and one person of colour), build in informal discussion opportunities to incorporate interactions between participants and presenters, and have a panel that includes a researcher, parent, and coach to demonstrate networking, and alternative perspectives.

**Challenges and Limitations**

The challenges that arose during my research were in two areas: 1) participant recruitment and 2) volunteer dependability. Participant recruitment difficulties included: getting a response from the president of the hockey organization to initiate contact with coaches, lack of effort from coaches to send out the seminar information to their parents and coaching staff, and limited numbers of volunteers to participate in the education seminars. From some organizations I received a response from the president allowing me to contact the rep coaches in their association, but then I did not receive any responses from the coaches. From other organizations I received responses from the coaches notifying me that they were sending out my email to their parents, but I didn't receive any interest from parents in participating. Dependability of volunteers was disappointing. On the day of the education seminar, I found that many people who had expressed interest in participating did not show up.

A limitation of the quantitative aspect of this study is how generalizable it is to populations beyond female hockey coaches, trainers, managers, and parents. This study was completed with participants who have children playing girls' hockey, from two associations within the OWHA.

**Future Directions**

Future research needs to consider using larger groups to gain statistical significance when analyzing the data from the three different education formats used in this study. More research needs to be done at the level of concussion knowledge and attitudes toward concussion to better understand why athletes continue to play with symptoms, and how we can stop this trend.

One of the major concerns about concussions is if the education is there, why are people not responding to concussions in an appropriate manner. If the reason is a lack of information, how do we get the information to the athletes, parents and coaches if they are not able to attend a conference? Or are they attending the conferences and other information sessions but not receiving the information from someone they respect? A possible avenue to address awareness and education would be recommended reading by an author with high authority and capital. One such author, Ken Dryden, has both cognitive and social authority as well as economic and cultural capital. His most recent book "Game Change: the life and death of Steve Montador and the future of hockey" (Dryden, 2017) would be an accessible and educational resource for parents and coaches.

Concussion education should be mandatory for all parents, coaches and players before the beginning of a season. These training sessions should include people who have personal experiences with concussions and can relate to all participants at the education session, for example, have a player who has experienced a concussion, a parent who has a child who has had a concussion, and a coach who has coached a player with a concussion. These firsthand experiences would help to deliver the message of the severity of concussions from different points of view. It is also important to ensure there is a video or speaker to educate on signs and symptoms of a concussion and proper management. I found that after my education sessions there was a lengthy discussion about everyone's experiences with concussion, and a time for them to ask me and the other participants questions. Although one can't predict the questions and comments at the end in the format suggested above, it would be interesting to administer the RoCKAS-ST questionnaire pre- and post-session to assess the effectiveness of personal experience in

informing concussion knowledge and attitudes. I would also assess for attitudes about concussion as the season went on, over a variety of age groups and levels of play, to try to understand more about what might be affecting decision-making about concussion at different points in the season. This will necessitate finding other tools to evaluate attitude and motivation.

## References


Asken, B. M., McCrea, M. A., Clugston, J. R., Snyder, A. R., Houck, Z. M., & Bauer, R. M. (2016). "Playing through it": Delayed reporting and removal from athletic activity after concussion predicts prolonged recovery. *Journal of Athletic Training, 51,* 329-335.

Bagley, A. F., Daneshvar, D. H., Schanker, B. D., Zurakowski, D., d'Hemecourt, C. A., Nowinski, C. J., … Goulet, K. (2012). Effectiveness of the SLICE Program for Youth Concussion Education. *Clinical Journal of Sport Medicine, 22(5),* 385-389.

Baillargeon, A., Lassonde, M., Leclerc, S., & Ellemberg, D. (2012). Neuropsychological and neurophysiological assessment of sport concussion in children, adolescents and adults. *Brain Injury, 26(3),* 211-220.

Berkowitz, A. D. (2003). *An Overview of the Social Norms Approach*. In L. Lederman, L. Stewart, F. Goodhart, & L. Laitman, Changing the Culture of College Drinking: A Socially Situated Prevention Campaign. Hampton Press.

Cameron, C. (Ed) (2014) *Disability Studies, A Student's Guide*. London: Sage.

CanChild. Concussion Management: Return to School Guidelines for Children and Youth Brochure. Retrieved from https://canchild.ca/system/tenon/assets/attachments/000/000/291/original/MTBI-return_to_school_brochure.pdf.

Carson, J. D., Lawrence, D. W., Kraft, S. A., Garel, A., Snow, C. L., Chatterjee, A., … Fremont, P. (2014). Premature return to play and return to learn after a sport-related concussion. *Canadian Family Physician, 60,* 310-315.

Chin, N., & Porter, P. (2016). Concussion reporting behaviours of community college student-athletes and limits of transferring concussion knowledge during the stress of competition. *BMJ Open Sport and Exercise Medicine*, doi:10.1136/bjmsem-2016-000118.

Choe, M. C. (2016). The Pathophysiology of Concussion. *Current Pain and Headache Reports, 20(42)*.

Creswell, J. W. (2013). *Research Design – Qualitative, Quantitative, and Mixed Methods Approaches*, 4th Edition. Washington: Sage.

Csenge, B., Hutchison, M., Sheridan, T., Richards, D., & Comper, P. Concussion & Students – An Interprofessional Approach to Concussion Management. *The David L. MacIntosh Sport Medicine Clinic*.

Cusimano, M. D., Cook, D. J., Tator, C., Mansfield, E., & Ulrich, D. (2002). The effectiveness of an injury prevention educational intervention in teaching young hockey players about concussion. *Canadian Journal of Neurological Science*, *29*(2), 23-4.

Covassin, T., Elbin, R. J., & Sarmiento, K. (2012). Educating Coaches About Concussion in Sports: Evaluation of the CDC's "Heads Up: Concussion in Youth Sports" Initiative. *Journal of School Health, 82*, 233-238.

Daugherty, J., Miles, I., Sarmiento, K., Sansone, C., Kroshus, E., & Bethea, B. (2018). A Description and Evaluation of the Concussion Education Application HEADS UP Rocket Blades. *Society for Public Health Education*, 1-9.

Davis, G. A., Purcell, L., Schneider, K. J., Yeates, O. K., Gioia, G. A., Anderson, V., … Kutcher, J. S. (2017). The Child Sport Concussion Assessment Tool 5th Edition (Child SCAT5). *British Journal of Sports Medicine, 51*, 862-869.

Davis, L. (Ed) (2013*). The Disability Studies Reader*, 4th Edition. New York: Routledge/Taylor Francis.

Dryden, K. (2017). *Game Change: the life and death of Steve Montador and the future of hockey*. Toronto: McClelland & Stewart .

Echlin, P. S. (2010). Editorial: Concussion education, identification, and treatment within a prospective study of physician-observed junior ice hockey concussions: social context of this scientific intervention. *Neurosurgery Focus, 29(5),* 1-13

.

Echlin, P. S., Tator, C. H., Cusimano, M. D., Cantu, R. C., Taunton, J. E., Upshur, R. E., … Skopelja, E N. (2010). A prospective study of physician-observed concussions during junior ice hockey: implications for incidence rates. *Neurosurgery Focus, 29(5),* 1-10.

Fish, S. (1979) *Is there a text in this class? The Authority of Interpretive Communities*. Cambridge, MA: Harvard University Press.

Gessel, L. M., Fields, S. K., Collins, C. L., Dick, R. W., & Comstock, R. D. (2007). Concussions among United States high school and collegiate athletes. *Journal of Athletic Training, 42,* 495-503.

Goodley, D. (2016) What is Critical Disability Studies? A Keynote Address at the North American Federation for Adapted Physical Activity (NAFAPA). Edmonton, AB: The University of Alberta. September 23-25, 2016.

Government of Canada (2016, August 5). Concussions. Retrieved from http://canada.pch.gc.ca/eng/1465244566173

Guskiewicz, K. M., McCrea, M., Marshall, S. W., Cantu, R. C., Randolph, C., Barr, W., … Kelly, J. P. (2003). Cumulative effects associated with recurrent concussion in collegiate football players: the NCAA Concussion Study. *Journal of American Medical Association, 290(19),* 2549-2555.

Hall, S. (1980) 'Encoding/Decoding' in. S. Hall, D. Hobson, A. Lowe, and P. Willis, Eds., *Culture, Media, Language: Working Papers in Cultural Studies. 1972-79.* London: Hutchison.

Hutchison, M., Comper, P., Csenge, B., & Richards, D. (2014). Psychosocial and psychological factors related to relayed recovery from concussion in high school students [Abstract]. *British Journal of Sports Medicine, 48,* 610.

Kroshus, E., Baugh, C. M., Daneshvar, D. H., & Viswanath, K. (2014). Understanding Concussion Reporting Using a Model Based on the Theory of Planned Behavior. *Journal of Adolescent Health, 54,* 269-274.

Kroshus, E., Baugh, C. M., Hawrilenko, M., & Daneshvar, D. H. (2015). Pilot Randomized Evaluation of Publicly Available Concussion Education Materials: Evidence of a Possible Negative Effect. *Health Education & Behavior, 42(2),* 153-162.

Kroshus, E., Daneshvar, D. H., Baugh, C. M., Nowinski, C. J., & Cantu, R. C. (2014). NCAA Concussion Education in Ice Hockey: An Ineffective Mandate. *British Journal of Sports Medicine, 48, 135-40.*

Kroshus, E., Garnett, B. R., Baugh, C. M., & Calzo, J. P. (2015). Social Norms Theory and Concussion Education. *Health Education Research, 30(6),* 1004–13.

Kroshus, E., Garnett, B., Hawrilenko, M., Baugh, C. M., & Calzo, J. P. (2015). Concussion under-reporting and pressure from coaches, teammates, fans, and parents. *Social Science Medicine, 134,* 66-75.

Lincoln, Y.S., & Guba, E.G. (1985) Naturalistic Inquiry. Beverly Hills, CA.: Sage.

Lincoln, Y.S. & Guba, E.G. (1986) But is it rigorous? Trustworthiness and authenticity in Naturalistic evaluation. In D.D. Williams (Ed.), Naturalistic evaluation (New Directions for Evaluation, No. 30, pp.73-84), San Francisco, CA.: Jossey-Bass.

Luna, B., Garver, K. E., Urban, T. A., Lazar, N. A., & Sweeney, J. A. (2004). Maturation of cognitive processes from late childhood to adulthood. *Child Development, 75(5), 1357-1372.*

Majerske, C. W., Mihalik, J. P., Ren, D., Collins, M. W., Camiolo Reddy, C., Lovell, M. R., & Wagner, A. K. (2008). Concussion in Sports: Postconcussive Activity Levels, Symptoms, and Neurocognitive Performance. *Journal of Athletic Training, 43(3),* 265-274.

Maxwell, J. (2005). *Qualitative Research Design*. London: Sage.

McLeod, T., Schwartz, C., & Bay, C. (2007). Sport-related concussion misunderstandings among youth coaches. *Clinical Journal of Sports Medicine*, 17(2), 140-142.

McCrory, P., Johnston, K., Meeuwisse, W., Aubry, M., Cantu, R., Dvorak, J., … Schamasch, P. (2005). Summary and agreement statement of the 2nd International Conference on Concussion in Sport, Prague. *British Journal of Sports Medicine, 39,* 196–204.

McCrory, P., Meeuwisse, W. H., Aubry, M., Cantu, B., Dvorak, J., Echemendia, R.J., … Turner, M. (2013). Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich. *British Journal of Sports Medicine, 47,* 250-8.

McCrory, P., Meeuwisse, W., Dvorak, J., Aubry, M., Bailes, J., Broglio, S., … Vos, P.E. (2017). Consensus statement on conccusion in sport – the 5th international conference on concussion in sport held in Berlin, October 2016. *British Journal of Sports Medicine*, 1-10.

McKeever, C. K., & Schatz, P. (2003). Current Issues in the Identification, Assessment, and Management of Concussions in Sports-Related Injuries. *Applied Neuropsychology, 10(1),* 4-11.

Ontario Ministry of Education (2016, October 11). Policy/Program Memorandum No. 158. Retrieved from http://www.edu.gov.on.ca/extra/eng/ppm/158.pdf

Parker, E. M., Gilchrist, J., Schuster, D., Lee, R., & Sarmiento, K. (2015). Reach and Knowledge Change Among Coaches and Other Participants of the Online Course: "Concussion in Sports: What You Need to Know." *Journal of Head Trauma Rehabilitation, 30(3),* 198-206.

Provvidenza, C. F., & Johnston, K. M. (2009). Knowledge transfer principles as applied to sport concussion education. *British Journal of Sports Medicine, 43,* 68-75.

Provvidenza, C., Engebretsen, L., Tator, C., Kissick, J., McCrory, P., Sills, A., & Johnston, K. (2013). From consensus to action: knowledge transfer, education and influencing policy on sports concussion. *British Journal of Sports Medicine, 47,* 332-338.

Putukian, M. (2017). Clinical Evaluation of the Concussed Athlete: A View From the Sideline. *Journal of Athletic Training, 52 (3),* 236-244.

Rosenbaum, A. M., & Arnett, P. A. (2010). The development of a survey to examine knowledge about and attitudes toward concussion in high-school students. *Journal of Clinical and Experimental Neuropsychology, 32 (1),* 44-55.

Sady, M. D., Vaughan, C. G., & Gioia, G. A. (2011). School and the Concussed Youth: Recommendations for Concussion Education and Management. *Physical Medical Rehabilitation Clinic of North America, 22(4),* 701-719.

Savin-Baden, M., & Major, C. H. (2013). Qualitative Research: The essential guide to theory and practice. Routledge: New York, NY.

Tator, C. H. (2012). Sport Concussion Education and Prevention. *Journal of Clinical Sport Psychology, 6,* 293-301.

Tator, CH. (2013). Concussions and their consequences: current diagnosis, management and prevention. *Canadian Medical Association Journal, 185,* 975-979.

Titchkosky, T., & Michalko. R. (Eds) (2009) *Re-thinking Normalcy-A Disability Studies Reader*. Toronto; CSPI.

Van den Hoonaard, D. (2012) *Qualitative research in Action: A Canadian Primer*. Don Mills, ON: Oxford.

Vasavada, A.N., Danaraj, J., & Siegmund, G.P. (2008). Head and neck anthropometry, vertebral geometry and neck strength in height-matched men and women. *Journal of Biomechanics, 41,* 11-121.

Vehmas, S., & Watson, N. (2014). Moral wrongs, disadvantages, and disability: A critique of critical disability studies. *Disability & Society*, *29*(4), 638-650.

Wendell, S. (1996). *The Rejected Body: Feminist, Philosophical, Reflections on Disability*. New York: Routledge.

Williams, J. M., Langdon, J. L., McMillan, J., & Buckley, T. (2015). English professional football players concussion knowledge and attitude. *Journal of Sport and Health Science,* 1-9.

Williamson, R. W., Gerhardstein, D., Cardenas, J., Michael, D.B., Theodore, N., & Rosseau, N. (2014). Concussion 101: The Current State of Concussion Education Programs. *Neurosurgery*, *75,* 131-135.

## Appendix A – Email to Participants

Dear Coach, Trainer, Manager, or Parent,

I'm conducting a research study on coaches' knowledge about, and attitudes toward, concussions and I'd like to invite you to participate. The title of the study is: **An Examination of Concussion Education Practices**.

I'm the Principal Student Investigator, and it's part of my work in the Masters of Science (Kinesiology) program at Brock University. If you're interested in participating, you'd complete a short questionnaire about concussions, complete the concussion education session and then do the questionnaire again. This would take less than one hour of your time.

The letter of invitation attached to the bottom of this email gives more information regarding the following: what's involved, confidentiality, potential risks and benefits, and ethics clearance. If you'd like to participate or have any questions about the study or what you will be asked to complete, please email me back.

Thank you for your time,

Jaclyn Fox
Principal Student Investigator
Faculty of Applied Health Sciences
Brock University
jf10ea@brocku.ca

## Appendix B – Letter of Permission from League President

Dear President,

I'm conducting a research study on coaches, trainers, managers, and parents' knowledge about, and attitudes toward, concussions and I'd like to invite participants from your organization to participate. The title of the study is: **An Examination of Concussion Education Practices**.

I'm the Principal Student Investigator, and it's part of my work in the Masters of Science (Kinesiology) program at Brock University. I kindly ask your permission to send this out to the members of your association (i.e. coaches, trainers, manager, and parents). The participants would be asked to complete a short questionnaire about concussions, complete a concussion education session, and then do the questionnaire again. This would take less than one hour of their time.

The letter of invitation attached to the bottom of this email gives more information regarding the following: what's involved, confidentiality, potential risks and benefits, and ethics clearance. If you have any questions about the study or what you will be asked to complete, please email me back.

Thank you for your time,

Jaclyn Fox
Principal Student Investigator
Faculty of Applied Health Sciences
Brock University
jf10ea@brocku.ca

## Appendix C - Letter of Invitation/Consent Form

November XX, 2016

Project Title: **An Examination of Concussion Education Practices**

INVITATION

I'm conducting a research study on coaches' knowledge about, and attitudes toward, concussions and I'd like to invite you to participate. The title of the study is: **An Examination of Concussion Education Practices**. The study will be conducted by me, Jaclyn Fox, the Principal Student Investigator. I am a graduate student in the Masters of Science (Kinesiology) program at Brock University.

WHAT'S INVOLVED

The aim of the research study is to investigate coaches' knowledge about, and attitudes towards, concussion in youth sport. You will be asked to complete a brief questionnaire about concussions, complete the concussion education session and then do the questionnaire again. This would take less than one hour of your time. Once participants have expressed interest and agreed to attend, a date will be picked that does not conflict with your team's hockey schedule.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Participants may withdraw from the study without consequences, up until they have submitted the questionnaire in the sealed envelope. At this point, responses will be anonymous, and researchers will not be able to identify individual answers. Should you wish to withdraw from the research study, please inform the principal student investigator, or the faculty supervisor of the research study using the contact information below. Any of the participants that choose not to participate in the study will still be able to attend the educational seminar on a voluntary basis.

CONFIDENTIALITY

All data will be kept confidential. No coach's name will be written anywhere on the surveys. A numerical code will allow the principal student investigator to match up the completed (before and after) surveys anonymously. Only the principal student investigator, and the faculty supervisor will have access to the data. The results of the study may be published in professional and scholarly journals or presented at various conferences. Any presentation, report or publication resulting from this study will not contain any identifiable information about you. A summary of the group results will be sent to those participants who request it. Date will be kept for five years on my personal computer which is locked under a password.

POTENTIAL BENEFITS AND RISKS

This research study does not have any direct risks for the participants. As coaches of the girls hockey, you may feel obligated to take part. Please be assured that participating (or not) in the study will not affect

your standing and continued involvement in coaching for your current association. A possible benefit of participation is learning something new about concussion. The players on your team may indirectly benefit from your participation in this study by feeling more comfortable approaching you with possible concussion symptoms.

CONTACT INFORMATION AND ETHICS CLEARANCE

The study has been reviewed and received clearance from the Research Ethics Board of Brock University (File ###) and has been approved by the President of your association. If you do have any questions or concerns about this study please contact the investigators using the information below, or Brock University's Research Ethics Office (905-688-5550 ext. 3035 or reb@brocku.ca).

CONSENT FORM

I provide consent to participate in the study described above. I have made this decision based on the information I have read in the Informed Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

☐ I would like to receive feedback from the study upon data analysis completion

Email: _____

Name: _____

Signature of Participant: _____ Date:

Signature of Researcher: _____ Date:

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## Appendix D – RoCKAS-ST Questionnaire

NOTE: The phrase "Return to play/competition" refers to being cleared to play in both practice and games

**Section 1**

DIRECTIONS: Please read the following statements and circle TRUE or FALSE for each question.

| | | |
|---|---|---|
| 1. There is a possible risk of death if a second concussion occurs before the first one has healed. | TRUE | FALSE |
| 2. People who have had one concussion are more likely to have another concussion. | TRUE | FALSE |
| 3. Cleats help athletes' feet grip the playing surface. | TRUE | FALSE |
| 4. In order to be diagnosed with a concussion, you have to be knocked out. | TRUE | FALSE |
| 5. A concussion can only occur if there is a direct hit to the head. | TRUE | FALSE |
| 6. Being knocked unconscious always causes permanent damage to the brain | TRUE | FALSE |
| 7. Symptoms of a concussion can last for several weeks. | TRUE | FALSE |
| 8. Sometimes a second concussion can help a person remember things that were forgotten after the first concussion. | TRUE | FALSE |
| 9. Weightlifting helps to tone and/or build muscle. | TRUE | FALSE |
| 10. After a concussion occurs, brain imaging (e.g., CAT Scan, MRI, X-Ray, etc.) typically shows visible physical damage (e.g., bruise, blood clot) to the brain | TRUE | FALSE |
| 11. If you receive one concussion and you have never had a concussion before, you will become less intelligent. | TRUE | FALSE |
| 12. After 10 days, symptoms of a concussion are usually completely gone. | TRUE | FALSE |
| 13. After a concussion, people can forget who they are and not recognize others but be perfect in every other way. | TRUE | FALSE |
| 14. High-school freshman and college freshman tend to be the same age. | TRUE | FALSE |
| 15. Concussions can sometimes lead to emotional disruptions. | TRUE | FALSE |
| 16. An athlete who gets knocked out after getting a concussion is experiencing a coma. | TRUE | FALSE |
| 17. There is rarely a risk to long-term health and well-being from multiple concussions. | TRUE | FALSE |

**Section 2**

DIRECTIONS: Please read each of the following scenarios and circle TRUE or FALSE for each question that follows the scenarios.

| | |
|---|---|
| **Scenario 1:**<br>*While playing in a game, Player Q and Player X collide with each other and each suffers a concussion. Player Q has never had a concussion in the past. Player X has had 4 concussions in the past.* | |
| 1. It is likely that Player Q's concussion will affect his long-term health and well-being. | TRUE FALSE |
| 2. It is likely that Player X's concussion will affect his long-term health and well-being. | TRUE FALSE |
| **Scenario 2:**<br>*Player F suffered a concussion in a game. She continued to play in the same game despite the fact that she continued to feel the effects of the concussion.* | |
| 3. Even though Player F is still experiencing the effects of the concussion, her performance will be the same as it would be had she not suffered a concussion. | TRUE FALSE |

**Section 3:**

DIRECTIONS: For each question circle the number that best describes how you feel about each statement.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 1. I would continue playing a sport while also having a headache that resulted from a minor concussion. | 1 | 2 | 3 | 4 | 5 |
| 2. I feel that coaches need to be extremely cautious when determining whether an athlete should return to play. | 1 | 2 | 3 | 4 | 5 |
| 3. I feel that concussions are less important than other injuries. | 1 | 2 | 3 | 4 | 5 |
| 4. I feel that an athlete has a responsibility to return to a game even if it means playing while still experiencing symptoms of a concussion. | 1 | 2 | 3 | 4 | 5 |
| 5. I feel that an athlete who is knocked unconscious should be taken to the emergency room. | 1 | 2 | 3 | 4 | 5 |

**Section 4:**

DIRECTIONS: For each question read the scenarios and circle the number that best describes your view. (For the questions that ask you what *most athletes* feel, base your answers on how you think MOST athletes would feel.)

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Scenario 1:<br>*Player R suffers a concussion during a game. Coach A decides to keep Player R out of the game. Player R's team loses the game.* | | | | | |
| 1. I feel that Coach A made the right decision to keep Player R out of the game. | 1 | 2 | 3 | 4 | 5 |
| 2. Most athletes would feel that Coach A made the right decision to keep Player R out of the game. | 1 | 2 | 3 | 4 | 5 |
| *Scenario 2:*<br>*Athlete M suffered a concussion during the first game of the season. Athlete O suffered a concussion of the same severity during the semifinal playoff game. Both athletes had persisting symptoms.* | | | | | |
| 3. I feel that Athlete M should have returned to play during the first game of the season. | 1 | 2 | 3 | 4 | 5 |
| 4. Most athletes would feel that Athlete m should have returned to play during the first game of the season. | 1 | 2 | 3 | 4 | 5 |
| 5. I feel that Athlete O should have returned to play during the semifinal playoff game | 1 | 2 | 3 | 4 | 5 |
| 6. Most athletes feel that Athlete O should have returned to play during the semifinal playoff game. | 1 | 2 | 3 | 4 | 5 |
| *Scenario 3:*<br>*Athlete R suffered a concussion. Athlete R's team has an athletic trainer on the staff.* | | | | | |
| 7. I feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. | 1 | 2 | 3 | 4 | 5 |
| 8. Most athletes would feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. | 1 | 2 | 3 | 4 | 5 |
| *Scenario 4:*<br>*Athlete H suffered a concussion and he has a game in two hours. He is still experiencing symptoms of a concussion. However, Athlete H knows that if he tells his coach about the symptoms, his coach will keep him out of the game.* | | | | | |
| 9. I feel that Athlete H should tell his coach about the symptoms. | 1 | 2 | 3 | 4 | 5 |
| 10. Most athletes would feel that Athlete H should tell his coach about the symptoms. | 1 | 2 | 3 | 4 | 5 |

**Section 5:**

DIRECTIONS: Think about someone who has had a concussion. Check off the following signs and symptoms that you believe someone may be likely to experience AFTER a concussion.

| ✓ | ✓ |
|---|---|
| Abnormal sense of smell | Abnormal sense of taste |
| Blurred vision | Amnesia |
| Black eye | Chest pain |
| Confusion | Dizziness |
| Headache | Loss of consciousness |
| Nausea | Nosebleed |
| Numbness/tingling in upper extremity | Sharp burning pain in the neck |
| Sleep disturbances | Weakness of neck range of motion |

## Appendix E – Demographic Questionnaire

Your role (coach, assistant coach, trainer, manager, parent): _____

Coaching courses completed and when:

_____

Training courses completed and when:

_____

Years involved in hockey: _____

Personal experience of concussion (yourself or daughter):

_____

## Appendix F – Guideline for Manifest Content Analysis

**Brochure/Conference program**

Font size and type, colour, placement on page, distribution and ratio of image to text
Number of lines per page
Proper names, use of designations
Titles of presentations, placement
Table of contents
Sponsors
Cover, front and back
Concurrency
Layout of pages and sequence of pages
Portrait or landscape
Headings
Session descriptions/session titles
Target audience
Time of day
Location
Duration
Moderators
Ease of reading

**Videos of Keynote Speakers (if available)**

Type of room
Arrangement of chairs, lectern, board, screen, A-V, microphones
Numbers (approx.) attending
Lighting
Location
Time of day
Target audience
Attending audience
Interactions between presenter and attendees (eg, Q&A, discussion, participation)
How introduced
Duration of session
Follow up time after presentation
Transition out of room
Camera angle/perspective

## Appendix G – Participant Demographic Tables

*Participants' Characteristics*

*Video Only Group*

| Participant Role | Coaching courses completed and when | Training courses completed and when | Years involved in hockey | Personal experience with concussion |
|---|---|---|---|---|
| Coach & parent | Speakout (2013), Coaching Level 1& 2 (2016) | N/A | 7 years | Have had five myself, my daughter has had one |
| Parent | Baseball initiation (2017), no hockey | N/A | 20 years | Daughter believes to have had at least one concussion that was treated, possibly others not investigated due to not being voluntary about symptoms. |
| Assistant Coach | D1 Certified (2016) | Trainer Level 2 (2016) | 10 years | Personally had a few though hockey myself. Most recent one was from football. Daughter has had one concussion playing rep hockey. |
| Parent | N/A | N/A | 5 years | None. |
| Parent | N/A | Hockey Trainers Course (2015) | 10 years | None. |
| Manager & Parent | Speakout (2012) | Trainers Course (2013) | 26 years | 3 of 4 of my children have had concussions playing hockey. One of them suffers from post-concussion syndrome. |
| Parent | N/A | Trainers Course (2012) | 10 years | Children haven't had any, I have had a minor concussion playing women's |

| | | | | |
|---|---|---|---|---|
| | | | | beginner hockey in 2014. |
| Parent | N/A | Speakout (2013) | 21 years | One of my children have had a concussion playing hockey. She was off school for two weeks and off sport until headaches were gone. My husband has had multiple. |

*Story Only Group*

| Participant Role | Coaching courses completed and when | Training courses completed and when | Years involved in hockey | Personal experience with concussion |
|---|---|---|---|---|
| Parent & trainer | N/A | Trainers Course (2016) | 12 years | None. |
| Parent | N/A | N/A | 15 years | Both kids have been diagnosed with mild concussions twice. They never missed more than one day of school. |
| Parent & trainer | N/A | Trainers Course (2015) | 9 years | Three concussions myself from horseback riding, football, and volleyball. Child has had two concussions from hockey. |
| Coach | Development 1 (2016) | N/A | 42 years | None that I know of. |
| Parent | NCCP I, II (1984) | Trainers Certification (2006) | 15 years | Child dove off a 20 ft cliff head first, felt "poorly" and was sick the next day. Was taken to the doctor for hearing issues |

| | | | | |
|---|---|---|---|---|
| | | | | and never realized she had a concussion. Also, experienced a mild concussion from hockey. |
| Parent | Community Coaching, currently completing Competitive Level Coaching (2018) | Standard First Aid & CPR-C | 8 years | Personal – confirmed 2, unconfirmed 3 or 4<br>Children – 2 baseline tests, unfounded both times |
| Parent | N/A | N/A | - | Daughter had mild concussion. Symptoms were glossy eyes, headaches for a few days. Headaches kept coming and going for about a month after. |
| Parent & manager | Coach Stream (2010) | N/A | 15 years | Two of my boys and my daughter have each had concussions. Some were very short term until back to full play and others had 4-6 week recovery. |

*Video and Story Group*

| Participant Role | Coaching courses completed and when | Training courses completed and when | Years involved in hockey | Personal experience with concussion |
|---|---|---|---|---|
| Manager, parent, & trainer | N/A | Leader Respect in Sport (2015), OMHA Trainer's Course (2015) | 10 years as parent, trainer and/or manger | Son had concussion in 2017 caused by accidental contact with teammates stick in game. He |

| | | | | |
|---|---|---|---|---|
| | | | | was out of hockey for 2 weeks. |
| Coach & parents | D1 Certified | N/A | 30 years | Have had players with concussion symptoms, full darkness after incident and off school. |
| Parent | N/A | Trainers Course, Respect in Sport | 9 years | N/A |
| Head Coach | HP1 (High Performance 2014) | N/A | 46 years (playing and coaching) | No personal experience with self or children. Too many experiences with players over past five years. Average 2-3 per year per team. |
| Assistant Coach | Lacrosse Level 1 (1997), Hockey Level 1 (1996 & 2004), D1 Trained (2016) | Trainers Level 1 (2001) | 51 years | Daughter suffers from post-concussion syndrome for several years. |
| Assistant Coach | Coach Level 1 (1999), Concussion symposium (2013) | Trainers Level Certified (2009), re-certified (2014) | 50 years | Have personally had several concussions from hockey and football. Athletes I have coached have also had concussions. |
| Parent | N/A | N/A | Started playing at 10 years old – current | N/A |
| Parent | N/A | N/A | 18 years | Very little. |
| Parent | N/A | N/A | 5 years | None. |

## Appendix H - Athlete's Story Script Outline

- Due to my post-concussion syndrome and my processing difficulties I have decided to film my presentation and have a sheet in front of me with my script. This will help ensure the consistency from one presentation to the next.
- One of the greatest difficulties I have is putting words together.

- Hi there, for those of you who don't know me, my name is Jaclyn Fox. I am a Masters student at Brock University, completing my research on The Effectiveness of Concussion Education.
- My interest in this particular research comes from my past; I grew up playing hockey at an elite level and had ambitions of going on to play at the University level. I was sidelined in grade 12 after I sustained what we have guessed to be my 9th or 10th concussion.
- I had one major concussion when I was 13 years old where I was knocked out and don't remember anything from that day.
- I didn't get another diagnosed concussion for the next 2 years, but sustained multiple "bell ringers" during my Jr career, those of which I didn't think anything about, along with my trainers, parents, and doctor.
- One of the difficulties of dealing with a concussion is very often they are not recognized and can't be seen
- A few examples of hits I received during my Jr career, were getting an elbow to the head which caused me to fall. Another one I remember is when I went sliding into my goal post after back checking after a player, and I hit my head/neck on the net. After both of these incidences I experienced a headache for the rest of the game and day or two following but was told to take Advil and I'd be fine.
- I told my trainer, who was in school to become an athletic therapist, and she didn't ever seem to be alarmed or attempt to stop me from continuing to play.
- One of those hits resulted in a headache for 2 months straight, I finally said something to my parents and went to see my doctor. At that point in time I was sent to a neurologist who made me aware of all the hits to the head I received were actually concussions.
- Almost 80% of concussions do clear up within a few weeks with correct management, however a small number continue to experience symptoms that don't go away, which is known as post-concussion syndrome
- I have been dealing with the repercussions of post-concussion syndrome for the past 10 years. I have headaches daily, I'm always fatigued, I've have periods of dizziness... All which have changed my life especially academically, which is the greatest concern for our youth that are participating in sports. These athletes have to be successful in school in order to be successful the rest of their lives.
- I have been in school for many years since I stopped playing hockey. When I was forced to quit in grade 12, I also had to drop my morning class at school as I was having a hard time waking up in the morning. I would sleep for close to 12 hours each night, which involved putting myself to bed at 9pm or earlier.
- I was having difficulty focusing in class, remembering previous lessons, and recalling information
- While completing my degree at Brock, I had difficulty managing my symptoms from post-concussion syndrome and completing the work required. If I was having a good day with a minimal headache, I found myself trying to complete as much work as I could, but in turn this affected me more the next couple of days with a headache that wouldn't allow me to get out of bed. This would occur a couple times a month where I was unable to go on my computer, get to class, or even look at my phone. I would lay in the dark in hopes that it would go away sooner rather than later.

- Due to trying to manage my symptoms, I received accommodations which included a note taker for each class, extra time on midterms and exams, and at least 48 hours between each exam. As a Phys Ed major, I was also required to take multiple movement courses, which posed as difficult for me as I was unable to be in a gymnasium with that many people moving at once.
- I was unable to multi-task while studying, if I started studying for 2 exams at once I would start to mix the material together and forget which course it came from. 48 hours between exams gave me just enough time to study for the next one, assuming I didn't have a pounding headache.
- I finally feel as though I have the upper hand on my symptoms after completing 20-weeks of vision therapy, multiple chiropractic and massage appointments. Although I experience multiple days with headaches, I have finally noticed some days that I have gone headache free. It is most frustrating to me when I know this could have been avoided through proper diagnosis, and management, which is why I am here today.
- Full recovery from concussion should involve both a gradual return to the classroom followed by a graduated process of returning to play.
- Our level of knowledge today is much greater than it was when I was playing, and I think it is important to get out and educate not only our coaches and trainers, but also the parents of these athletes playing hockey. If I can play a role in preventing just one child experiencing what I have the past 10 years, then I will deem this a success.
- I strongly believe that if I was aware of the severity of the "bell ringers" and managed them properly, through rest both physically and cognitively I would still be playing the sport I love today.
- Over the past 5 years I have been coaching girls' hockey at the Midget A level which is 15-17 year olds, and have noticed the lack of education parents, trainers, and coaches have while working with these individuals, which is one of the reasons for conducting my research.
- The identification and management strategies that are publicly available online through sites like Centre for Disease Control's Heads Up, and Parachute are a great resource for parents, coaches, and trainers to use.
- One of the major concerns around concussions in athletes is the pressure they may feel from peers, coaches, and/or parents to continue playing through their symptoms such as headaches, confusion, memory loss, dizziness. Concussion diagnosis highly depends on athletes acknowledging the symptoms they are feeling, and putting aside their ego or pressures they are experiencing to play through the symptoms.
- The biggest difficulty with diagnosing concussions is that symptoms vary from person to person, and can also vary from one concussion to the next in the same individual. For this reason, it is very important that we are all educated in noticing the different symptoms and encouraging our athletes to speak up if/when they are experiencing these symptoms.

## Appendix I – Manifest Content

### Manifest Content

### International Concussion Summit 2016

**Page 1**

- Front cover page
- The conference logo on the right hand side
  - "INTERNATIONAL SUMMIT 2016" on the top line in size 10 font, light grey
  - "CONCUSSIONS" on the middle line in size 60 font, bolded, black
  - "Partnership-Protocol-Protection" on the bottom line in size 12 font, bolded, blue
- logo – appears to be a face and a head with circles coming from the head
- 4 bubbles coming from the head in four different colours
- One bubble is the same colour as "concussion"
- One bubble is the same colour as the face
- The other two aren't the same as anything else
- Looks like Niagara Falls in the background through a bubbled lens
-

**Page 2**

- Header
  - The conference logo on the left hand side
    - "INTERNATIONAL SUMMIT 2016" on the top line in size 10 font, light grey
    - "CONCUSSIONS" on the middle line in size 60 font, bolded, black
    - "Partnership-Protocol-Protection" on the bottom line in size 12 font, bolded, blue
  - "AGENDA" on the right hand side in bold, blue font, size
- Agenda for Thursday and Friday listed with Keynote Speaker names, and breakout sessions numbers (no names)
- Thursday, April 21, 2016 (bolded letters at top right)
- 7:00 – 9:00am
  - Registration and Refreshments
- 9:00 – 9:15am
  - Opening Remarks:
  - Warren Hoshizaki, Director of Education, District School Board of Niagara (bolded and italicized letters)
- 9:15 – 10:45am
  - Keynote Speakers:
  - Dr. Charles Tator, Professor of Neurosurgery, University of Toronto (bolded and italicized letters)
  - Dr. Blaine Hoshizaki, Professor, School of Human Kinetics, University of Ottawa (bolded and italicized letters)
- 1045 – 11:00am
  - Break and Refreshments
- 11:00 – 11:45am

- Sessions 1A, 1B, 1C, 1D, 1E, 1F
- 11:45 – 12:45am
  - Lunch: Buffet in Pranzo Grill (first floor)
- 1:00 – 2:00pm
  - Keynote Speaker:
  - Dr. Roger Zemek, Children's Hospital of Eastern Ontario (bolded letters)
- 2:00 – 2:45pm
  - Sessions: 2A, 2B, 2C, 2D, 2E, 2F
- 2:45 – 3:45pm
  - Keynote Speaker:
  - Dr. Pat Bishop, University of Waterloo (bolded letters)
- 3:45 – 4:30pm
  - Vendor Discussions and Networking
- Friday, April 22, 2016 (bolded letters)
- 6:30 – 8:00am
  - Breakfast: Buffet in Grand Caffe (first floor)
- 8:30 – 9:45am
  - Keynote Speakers:
  - Dr. Gerald Gioia – Washington State University (bolded letters)
  - Hon. Liz Sandals – Minister of Education (bolded letters)
- 9:45 – 10:30am
  - Sessions: 3A, 3B, 3C, 3D, 3E, 3F
- 10:30 – 10:45am
  - Break and Refreshments
- 10:45 – 11:30am
  - Sessions: 4A, 4B, 4C, 4D, 4E, 4F
- 11:30 – 12:30pm
  - Keynote Speaker:
  - Thurman Thomas – NFL Hall of Fame (bolded letters)
- 12:30 – 12:35pm
  - Closing Remarks
- **Partnership**
- **Protocol**
- **Protection**

**Page 3**

- 
- Header
  - The conference logo on the right hand side
    - "INTERNATIONAL SUMMIT 2016" on the top line in size 10 font, light grey
    - "CONCUSSIONS" on the middle line in size 60 font, bolded, black
    - "Partnership-Protocol-Protection" on the bottom line in size 12 font, bolded, blue
  - "WELCOME" on the left hand side in bold, blue font, size

- Warren Hoshizaki – black lettering
  Director of Education – black lettering (smaller than name)
  District School Board of Niagara – black lettering (same size as line above)
- Coloured head shot on right side of the page
  - Wearing a suit, and tie
  - Bald, grey hair on sides
  - Grey scale background
- Welcomes "athlete, coach, teacher, health care professional, or parent"
- Signature bottom left side of page
-

**Page 4**

- Header
  - Keynote Speakers – black, bolded lettering
  - White and blue light coloured background
  - Black line bordering in the header
- 1 inch think blue line down the left hand side of the page
- Thursday, April 21, 2016 – blue lettering
- Dr. Charles Tator – black lettering
  Professor of Neurosugery, University of Toronto – black lettering (smaller than name)
  And Founder of ThinkFirst – black lettering (same size as line above)
- Coloured picture of Dr. Charles Tator on the left hand side of the page
  - Wearing a lab coat, dress shirt, tie, glasses
  - Bald, grey hair on sides
  - Window and beige wall in background
- Logo on bottom left hand side of the page
  - Parachute – grey scale lettering
  - A green parachute arching over the "hute"
  - PREVENTING INJURIES. SAVING LIVES – grey scale lettering underneath the word Parachute (much smaller than Parachute)
- 25 lines of a description
  - Trained in Neurosurgery and Neuropathology
  - Was chair of Neurosurgery at the University of Toronto
  - Was head of Neurosurgery at the Toronto Western Hospital
  - Founded ThinkFirst, Canada
  - 2012, ThinkFirst merged with three other national injury prevention charities to form Parachute Canada
  - Board member of Parachute Canada
  - Held two research chairs at the University of Toronto
  - A member of the Order of Canada, and the Canadian Medical Hall of Fame
  - Currently, is a Senior Scientist in the Toronto Western Research Institute and Project Leader of the Canadian Sports Concussion Project at the Krembil Neuroscience Centre
  - Awards received from:
    - Canadian Paraplegic Association
    - The University of California Reeve-Irvine

        - Canadian Brain Injury Coalition
        - USA Hockey
        - American Spinal Injuries Association
    - Published a book: Catastrophic Injuries in Sports and Recreation – published by the University of Toronto Press in 2008
    - Practice Primer on Concussions appeared in the Canadian Medical Association Journal in 2013
    - 2014 – awarded the Medal of Honour by Canada's Pharmaceutical Association
- 2 in. of white space at bottom of page

**Page 5**

- Header
    - Keynote Speakers – black, bolded lettering
    - White and blue light coloured background
    - Black line bordering in the header
- 1 inch think blue line down the left hand side of the page
- Dr. T. Blaine Hoshizaki – black lettering
  Faculty of Health Sciences, School of – black lettering (smaller than name)
  Human Kinetics, University of Ottawa – black lettering (same size as line above)
- Coloured picture of Dr. T. Blaine Hoshizaki on the left hand side of the page
    - Wearing a suit and tie
    - Full head of dark hair
    - White background
- 35 lines of a description
    - Facts on concussion
        - Sport related head and neck injuries are responsible for some of the most catastrophic injuries
        - In 2003-2004, sports and recreational activities were the third leading cause of traumatic head injury admissions in Canadian hospitals
        - 28% of all children admitted in the emergency ward for traumatic head injuries were due to such activities
        - Protective head gear is the most effective intervention strategy
    - Developed the Neurotrauma Impact Research Laboratory at the University of Ottawa – 2005
    - Laboratory vision "Head injuries will become a rare and inconsequential part of athletic and leisure activities"
    - Dr. Hoshizaki participates in national and international helmet standard organizations (ASTM, CSA, HECC, CE, ISO)
    - Techinical advisor for ThinkFirst
    - Named as on of the top fifty most influential people in sport in 2011 by Globe and Mail
- 1 in. of white space at the bottom of page

**Page 6**

- Header

    - Keynote Speakers – black, bolded lettering
    - White and blue light coloured background
    - Black line bordering in the header
- 1 inch think blue line down the left hand side of the page
- Thursday, April 21, 2016 – blue lettering
- Dr. Roger Zemek – black lettering
  Children's Hospital of Eastern Ontario – black lettering (smaller than name)
- Coloured picture of Dr. Roger Zemek on the left hand side of the page
    - Wearing a white lab coat, dress shirt, tie, and stethoscope
    - Full head of dark hair
    - Looks like a hospital room in the background
- 14 lines of description:
    - MD
    - Associate Professor of Pediatrics in the Division of Pediatric Emergency Medicine at CHEO and University of Ottawa
    - Director of Pediatric Emergency Research at CHEO
    - Clinical Research Chair in Pediatric Concussion at the University of Ottawa
    - Leads a pan-Canadian multi-centre study on predictors for persistent concussion symptoms in children
    - Largest study of concussion in the world
    - Led an international team for the development of comprehensive guidelines for the management of pediatric concussion
- Dr. Patrick J. Bishop – black lettering
  Professor, Department of Kinesiology – black lettering (smaller than name)
  University of Waterloo – black lettering (same size as line above)
- Coloured picture of Dr. Patrick J. Bishop on the left hand side of the page half way down
    - Wearing a dress shirt, unbuttoned, glasses
    - Full head of grey hair
    - White background
- 15 lines of description:
    - Professor Emeritus from the University of Waterloo
    - Adjunct Professor at the University of Ottawa
    - Research interests are in trying to understand the mechanics associated with catastrophic injury
    - Authored/coauthored over 130 scientific publications and presentations
    - Chair of the Canadian Standards Association (CSA) Technical Committee on Equipment and Facilities for ice hockey
    - Member of American Society for Testing and Materials Committee F-8 on Sport Equipment
    - Head of the Delegation for Canada to the International Organization for Standardization (ISO) Technical Committee 83
- Half an inch of white space at the bottom

**Page 7**

- Header
    - Keynote Speakers – black, bolded lettering

    - White and blue light coloured background
    - Black line bordering in the header
- 1 inch think blue line down the left hand side of the page
- Dr. Patrick J. Bishop description continued for 14 lines:
    - Sub Committee 5 on Equipment and Facilities for Ice Hocey
    - Member of the NOCSAE Scientific Advisory Commuttee
    - Contributed to several Concussion Seminars sponsored by ThinkFirst Canada, Hockey Canada, and the Dr. Tom Pashby Safety Fund
- Friday, April 22, 2016 – blue lettering half way down the page
- Dr. Gerald Gioia – black lettering
  PhD, Washington State University – black lettering (smaller than name)
- Coloured picture of Dr. Gerald Gioia on the left hand side of the page
    - Wearing a dress shirt, tie
    - Full head of dark hair
    - Looks like an office window in the background with blinds
- 15 lines of description:
    - the Division Chief of Pediatric Neuropsychology at the Children's National Health System
    - Directs the SCORE concussion program
    - Professor of Pediatrics and Psychiatry at the GWU School of Medicine
    - Developed a number of post-concussion tools for children
    - Worked with CDC on their "Heads Up" concussion educational toolkits
    - Participated in the International Concussion in Sport Group Consensus meetings, American Academy of Neurology Sports Concussion Guideline panel, and the CDC's mild TBI guideline development
    - Works with the Washington Capitals, Baltimore Ravens, and many youth organizations
- Half an inch of white space at the bottom

**Page 8**

- Header
    - Keynote Speakers – black, bolded lettering
    - White and blue light coloured background
    - Black line bordering in the header
- 1 inch think blue line down the left hand side of the page
- Hon. Liz Sandals – black lettering
  Minister of Education – black lettering (smaller than name)
- Coloured picture of Hon. Liz Sandals on the left hand side of the page beside name
    - Wearing a white shirt, red scarf, earrings
    - Grey hair
    - Grey background
- 30 lines of description:
    - Currently serves as the Minister of Education
    - Has served at the Parliamentary Assistant to the Ministers of Health and Long-Term Care, Transportation, Education, Government Services, and Community Safety and Correctional Services

- Has overseen development of a new collective bargaining framework, taken steps to modernize childcare, and released Achieving Excellence: A Renewed Vision for Education in Ontario
- Led the government's Safe Schools Action Team
- Served on the Standing Committee on Public Accounts, the Select Committee on Mental Health and Addictions, and Treasury Board/Management Board of Cabinet
- Elected to the local public school board in 1988, and was re-elected four times
- Served as chair of the board and was elected as president of the Ontario Public School Boards' Association (OPSBA) from 1988 to 2002
- Sat on the board of directors of the Canadian School Boards Association
- Selected as the first recipient of the "Outstanding Contribution to Education Award" by the Ontario Principals' Council
- The Centre for Addiction and Mental Health's Centre for Prevention Sciences (London) presented her with their 2009 Fourth R Award

- 2 in. white space at the bottom of page

**Page 9**

- Header
  - Keynote Speakers – black, bolded lettering
  - White and blue light coloured background
  - Black line bordering in the header
- 1 inch think blue line down the left hand side of the page
- Friday, April 22, 2016 – blue lettering top left side of page under header
- Thurman Thomas – black lettering
- Coloured picture of Thurman Thomas on the right hand side of the page beside name
  - Wearing an unbuttoned dress shirt, and jacket
  - Bald
  - Grey background
- 36 lines of description:
  - Bio:
    - Slipped to the second round of the 1988 NFL draft due to a knee injury
    - The Buffalo Bills selected Thomas, an All-American running back, with the 40th overall pick
    - 1989 season – rushed for 1,000 yards, caught 60 passes, and score 12 touchdowns in his second season
    - Full description of his playing history

**Page 10**

- Header
  - Sessions – white, bolded lettering
  - Royal blue coloured background
  - Black line bordering in the header
- Thursday, April 21, 2016 – blue lettering top left side of page

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|

Breakout Sessions

| | | | | |
|---|---|---|---|---|
| 1A | Parachute Canada – Alex Kelly | Senior Coordinator | Concussion Ed. Mobile App | 16 lines |
| 1B | Barbara Csenge | B.A., B.Ed., MSc Student | Recovery from Concussion in a Cohort of Male High School Students | 23 lines |
| 1C | Football Canada – Aaron Geisler | Technical Coordinator | Using Long Term Athlete Development as a vehicle for Concussion Prevention in Sport | 14 lines |

- Session 1A description (column 1):
  - Present the latest addition to the concussion education world – Concussion Ed.
  - New mobile App – combined user experience and evidence based content to provide Canadians with the best concussion resources
  - Parachute will share the development and deployment process
  - The organization's experience in emerging technologies, as well as video development, will be detailed, in providing an insider's look at the key learning's and successes

Resource

Not Specific

- Session 1B description (column 1 and 2):
  - A presentation of results and discussion of a longitudinal cohort examining recovery time from concussion and contribution of pre-existing conditions in a cohort of male high school students
  - Participants include 116 adolescent male student
  - 37.9% were students with a history of learning difficulty and 46.6% had a history of one or more concussions
  - This study addresses a knowledge gap and provides evidence that on average, adolescent students take longer to recover than adults and that pre-existing learning difficulties and a history of concussion can further prolong recovery

Research

School

- Session 1C description (column 2):
  - This session will help guide the development of a complete concussion prevention and management protocol for all levels of football by utilizing long term athlete development principles to help enhance all of the processes and tools
  - Utilizing LTAD in conjunction with education for parents, athletes, coaches, and administrators, equipment fitting, baseline testing, sideline assessments, and implementation guidelines will help to improve safety and the culture around safety

Prevention/ Education

Sport

- 2 in. white space at the bottom of the second column

**Page 11**

- Header
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- Thursday, April 21, 2016 – blue lettering top right side of page

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 1D | OSBIE – Julie Welsh | Risk Management Program Coordinator | Concussions – Where are Your Risks? | 17 lines |
| 1E | LikeMark Health – Anne Edgell-Kennedy | BSc PT, MSc (PT), FCAMPT Physiotherapist & Clinic Director | Active Recovery: Rehabilitation for Persistent Concussion Symptoms | 30 lines |
| 1F | Ministry of Education – Athena Goodfellow Todd Bright | Policy Analyst<br><br>Education Officier, Health School Unit | School Board Policies on Concussion (PPM 158) | 9 lines |

- Session 1D description (column 1):
  - Recent media focus, combined with a $750 million settlement with former NFL players has increased the awareness of the risks of long term brain damage
  - The need for school board to be aware of concussion injuries and to develop/implement an appropriate response protocol once a concussion has been diagnosed
  - This session will focus on identifying the risks schools face, identify common sources of concussions in a school setting and discuss the challenges in managing this emerging risk
- Session 1E description (column 1 and 2):
  - Anne worked and taught at the Fowler Kennedy Sports Medicine Clinic
  - Faculty member at the University of Western Ontario
  - Since 2012 – been the clinic director at LifeMark Physiotherapy Fonthill working in orthopedic, and vestibular physiotherapy
  - 80% of concussions recover with rest within the first 7 to 10 days, there are some who suffer from persistent symptoms and struggle to return to school and their sports
  - Anne will present current research which indicates that concussion recovery requiresmore than sitting in a dark room with no stimulation
  - LifeMark uses the ImPACT neurocognitive assessment tool as part of their concussion management program
- Session 1F description (column 2):
  - To provide an overview of School Board Policies on Concussions (PPM 158) and the resources available to support implementation
  - Provide an opportunity for participants to engage in meaningful dialogue and share promising practices related to policy development and implementation

Education

School

Concussion Management

School + Sport

Protocol

Not Specific

**Page 12**

- Header
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- Thursday, April 21, 2016 – blue lettering

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 2A | Parachute Canada – Alex Kelly | Senior Coordinator | Concussion Ed. Mobile App | 16 lines |
| 2B | Barbara Csenge | B.A., B.Ed., MSc Student | Recovery from Concussion in a Cohort of Male High School Students | 23 lines |
| 2C | Football Canada – Aaron Geisler | Technical Coordinator | Using Long Term Athlete Development as a vehicle for Concussion Prevention in Sport | 14 lines |

- Session 2A description (column 1):
  - Present the latest addition to the concussion education world – Concussion Ed.
  - New mobile App – combined user experience and evidence based content to provide Canadians with the best concussion resources
  - Parachute will share the development and deployment process
  - The organization's experience in emerging technologies, as well as video development, will be detailed, in providing an insider's look at the key learning's and successes

Resource

- Session 2B description (column 1 and 2):
  - A presentation of results and discussion of a longitudinal cohort examining recovery time from concussion and contribution of pre-existing conditions in a cohort of male high school students
  - Participants include 116 adolescent male student
  - 37.9% were students with a history of learning difficulty and 46.6% had a history of one or more concussions
  - This study addresses a knowledge gap and provides evidence that on average, adolescent students take longer to recover than adults and that pre-existing learning difficulties and a history of concussion can further prolong recovery

Research

- Session 1C description (column 2):
  - This session will help guide the development of a complete concussion prevention and management protocol for all levels of football by utilizing long term athlete development principles to help enhance all of the processes and tools
  - Utilizing LTAD in conjunction with education for parents, athletes, coaches, and administrators, equipment fitting, baseline testing, sideline assessments, and implementation guidelines will help to improve safety and the culture around safety

Prevention/ Education

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**Page 13**

- Header
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- Thursday, April 21, 2016 – blue lettering

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 2D | OSBIE – Julie Welsh | Risk Management Program Coordinator | Concussions – Where are Your Risks? | 17 lines |
| 2E | Brock University – Dawn Good | Ph.D., C. Psych. | From research to practice: Applied strategies to assist students' return to the classroom following a concussion | 20 lines |
| 2F | Ministry of Education – Athena Goodfellow Todd Bright | Policy Analyst<br><br>Education Officier, Health School Unit | School Board Policies on Concussion (PPM 158) | 9 lines |

- Session 2D description (column 1):
  - Recent media focus, combined with a $750 million settlement with former NFL players has increased the awareness of the risks of long term brain damage
  - The need for school board to be aware of concussion injuries and to develop/implement an appropriate response protocol once a concussion has been diagnosed
  - This session will focus on identifying the risks schools face, identify common sources of concussions in a school setting and discuss the challenges in managing this emerging risk

Education

- Session 2E description (column 1 and 2):
  - Interactive workshop will provide educators and coaches with an understand of how a concussive-type injury to the brain affects behavior in children and adolescents
  - How to apply best practice strategies encouraging their return to the classroom or safe return to the field
  - Real like case studies
  - Discuss how post-concussive symptoms may present post injury, how it differs from psychopathology, and how best to assist your students academically, socially, emotionally, and behaviourally

Education/ Concussion Management

School & Sport

- Session 2F description (column 2):
  - To provide an overview of School Board Policies on Concussions (PPM 158) and the resources available to support implementation
  - Provide an opportunity for participants to engage in meaningful dialogue and share promising practices related to policy development and implementation

Protocol

**Page 14**

- Header
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  - Black line bordering in the header
- Friday, April 22, 2016 – blue lettering

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 3A | First office for Injury, Sunnybrook Hospital – Brady Tanenbaum | Program Coordinator | What does "safe" mean to you? Injury Prevention strategies to reduce the incidence of concussion | 21 lines |
| 3B | Ontario Brain Injury Association – Ruth Wilcock<br>Katie Muirhead | Executive Director<br><br>Advocacy Specialist | Supporting Students with Concussions | 25 lines |
| 3C | EMPWR Foundation – Ben Fanelli | EMPWR Founder | EMPWR Foundation | 15 lines |

- Session 3A description (column 1):
  - Definition of "safe" – understood traditionally as the absence of physical injury
  - Stakeholders often neglect the active component of safety – injury prevention
  - When safety is seen as a process, not an outcome, the inevitability of injury as an acceptable part of the sport experience becomes unacceptable
  - This presentation will review injury prevention strategies in the context of sport and recreation programs and explore the process for mitigating concussion risk

Prevention

Sport

- Session 3B description (column 1 and 2):
  - Multi-dimensional challenges that students, educators and families face after a child returns to the classroom following a concussion/brain injury
  - This session will discuss strategies and general techniques when working with students who have sustained concussion
  - Using case examples of what has worked and not worked in accommodating students with concussion
  - Opportunity for discussion and questions regarding how to best work with students in your classroom who have ongoing return to learn issues after a concussion

Concussion Management

School

- Session 3C description (column 2):
  - Ben Fanelli is a former Ontario Hockey League (OHL) player with the Kitchener Rangers (2009-2014) and one of the founding directors of EMPWR Foundation – an organization that aims to inspire and inform the sport culture, advance the research and empower the individual to recovery following brain injury

Education/ Management

Sport

- Describes Ben's severe traumatic brain injury suffered at age of 16 during an OHL game

**Page 15**

- Header
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- Friday, April 22, 2016 – blue lettering

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 3C | EMPWR Foundation – Ben Fanelli | | | 30 lines |
| 3D | Holland Bloorview – Dr. Nick Reed<br>Talia Dick | PhD., OT. Reg. (Ont)<br>OT. Reg. (Ont) | Pediatric Concussion | 15 lines |
| 3E | District School Board of Niagara – Michael Langlois<br>Lora Courtois | Health and Safety Officer<br>Superintendent of Education | HEAD STRONG… Playing Safe, Staying Healthy | 11 lines |

- Session 3C description continued (column 1):
  - Continued
  - After a long and intense recovery period of two years, Ben returned to his team
  - Talks about awards he won and level of play within his team
- Session 3D description (column 2):
  - This presentation will focus on describing the signs and symptoms of concussion, present the impact of concussion on functional daily activities, describe the current state of pediatric concussion research and present recommendations for management of concussion
- Session 3E description (column 2):
  - The workshop focuses on the ever changing information regarding concussions and building partnerships to move concussion protocol forward

Concussion Management

Partnership

Not Specific

Not Specific

**Page 16**

- Header
  - Sessions – white, bolded lettering
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  - Black line bordering in the header
- Friday, April 22, 2016 – blue lettering

| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 3F | Ophea – Nancy Schad, Bob Soroko | Safety Consultants | One Year In: Concussion Policy | 15 - 16 |

| | | | | |
|---|---|---|---|---|
| | | | Management and Evaluation | |
| 4A | First office for Injury, Sunnybrook Hospital – Brady Tanenbaum | Program Coordinator | What does "safe" mean to you? Injury Prevention strategies to reduce the incidence of concussion | 21 lines |
| 4B | Ontario Brain Injury Association – Ruth Wilcock<br>Katie Muirhead | Executive Director<br><br>Advocacy Specialist | Supporting Students with Concussions | 25 lines |

- Session 3F description (column 1):
  - Participants will have the opportunity to learn, share and network about best practices that school boards have used and/or are planning to implement the components of their school board concussion policy
- Session 4A description (column 1 and 2):
  - Definition of "safe" – understood traditionally as the absence of physical injury
  - Stakeholders often neglect the active component of safety – injury prevention
  - When safety is seen as a process, not an outcome, the inevitability of injury as an acceptable part of the sport experience becomes unacceptable
  - This presentation will review injury prevention strategies in the context of sport and recreation programs and explore the process for mitigating concussion risk
- Session 4B description (column 2):
  - Multi-dimensional challenges that students, educators and families face after a child returns to the classroom following a concussion/brain injury
  - This session will discuss strategies and general techniques when working with students who have sustained concussion
  - Using case examples of what has worked and not worked in accommodating students with concussion
  - Opportunity for discussion and questions regarding how to best work with students in your classroom who have ongoing return to learn issues after a concussion

**Page 17**

- Header
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| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 4C | EMPWR Foundation – Ben Fanelli | | | 30 lines |

| | | | | |
|---|---|---|---|---|
| 4D | Holland Bloorview – Dr. Nick Reed<br>Talia Dick | PhD., OT. Reg. (Ont)<br>OT. Reg. (Ont) | Pediatric Concussion | 15 lines |

- Session 4B description continued (column 1):
  - Continued for 3 lines
- Session 4C description (column 1 and 2):
  - Ben Fanelli is a former Ontario Hockey League (OHL) player with the Kitchener Rangers (2009-2014) and one of the founding directors of EMPWR Foundation – an organization that aims to inspire and inform the sport culture, advance the research and empower the individual to recovery following brain injury
  - Describes Ben's severe traumatic brain injury suffered at age of 16 during an OHL game
  - After a long and intense recovery period of two years, Ben returned to his team
  - Talks about awards he won and level of play within his team
- Session 4D description (column 2):
  - This presentation will focus on describing the signs and symptoms of concussion, present the impact of concussion on functional daily activities, describe the current state of pediatric concussion research and present recommendations for management of concussion

Education / Management

Concussion Management

**Page 18**

- Header
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| Session | Name | Designations | Title of Presentation | Description |
|---|---|---|---|---|
| 4E | Neurotrauma Impact Science Laboratory, Faculty of Health Sciences, University of Ottawa – Lauren Dawson | HBSc, MSc | Impact Characteristics Describing Concussion Injuries in Youth | |
| 4F | Ophea – Nancy Schad, Bob Soroko | Safety Consultants | One Year In: Concussion Policy Management and Evaluation | |

- Session 4E description (column 1): Research
  - Learn, share + network about best practices in school
- Session 4F description (column 2):
  - Participants will have the opportunity to learn, share and network about best practices that school boards have used and/or are planning to implement the components of their school board concussion policy

Not Specific

Partnership

**Page 19**
logos

**Page 20**
Back cover

**Common Characteristics**

- Who shares a page
    - Keynotes
        - Warren Hoshizaki – own full page
        - Dr. Charles Tator – own full page
        - Dr. T. Blaine Hoshizaki – own full page
        - Dr. Roger Zemek – half page shared with Dr. Patrick J. Bishop
        - Dr. Patrick J. Bishop – full page split between two pages
        - Dr. Gerald Gioia – half page shared with Dr. Patrick J. Bishop
        - Hon. Liz Sandals – own full page
        - Thurman Thomas – own full page
- What are some patterns
- Connections between sessions

**Breakout Sessions**

- Breakout Sessions have three entries per page split into two columns
- Alphabetic queuing
- **Session A** – done by program coordinators
- **Session B** – done by a researcher on day 1, and an executive director and advocacy specialist on day 2 – both touched on return to learn following concussion
- **Session C** – Sport related concussion prevention and management – day 1 is football and day 2 is hockey
- **Session D** – day 1 is a risk management program coordinator from school board, day 2 is a research from Holland Bloorview
- **Session E** – 4 different presenters for each time slot 1: Ministry of Education, 2: Brock University Professor, 3: District School Board of Niagara, 4: University of Ottawa researcher
- **Session F** – Day 1 presented by the Ministry of Education, day 2 presentation by Ophea

Partnership
Protocol
Protection

**Session 1 – Thursday April 21, 2016, 11:00 – 11:45 am**

- 1A - Parachute Canada – Concussion Ed. Mobile App
- 1B - Barbara Csenge – Recovery from Concussion in a Cohort of Male High School Students
- 1C - Football Canada – Using Long Term Athlete Development as a vehicle for Concussion Prevention in Sport

- 1D - Ontario School Board Insurance Exchange (OSBIE) – Concussions – Where are Your Risks?
- 1E - LifeMark Health – Active Recovery: Rehabilitation for Persistent Concussion Symptoms
- 1F - Ministry of Education – School Board Policies on Concussion (PPM 158)

**Session 2 – Thursday April 21, 2016, 2:00 – 2:45 pm**

- 2A - Parachute Canada – Concussion Ed. Mobile App
- 2B - Barbara Csenge – Recovery from Concussion in a Cohort of Male High School Students
- 2C - Football Canada – Using Long Term Athlete Development as a vehicle for Concussion Prevention in Sport
- 2D - OSBIE – Concussions – Where are Your Risks?
- 2E - Brock University – From research to practice: Applied strategies to assist students' return to the classroom following a concussion
- 2F - Ministry of Education – School Board Policies on Concussion (PPM 158)

**Session 3 – Friday April 22, 2016, 9:45 – 10:30 am**

- 3A - First Office for Injury, Sunnybrook Hospital – What does "safe" mean to you? Injury Prevention strategies to reduce the incidence of concussion
- 3B - Ontario Brain Injury Association – Supporting Students with Concussions
- 3C - EMPWR Foundation
- 3D - Holland Bloorview – Pediatric Concussion
- 3E - District School Board of Niagara – HEAD STRONG…Playing Safe, Staying Healthy
- 3F - Ophea – One Year In: Concussion Policy Management and Evaluation

**Session 4 – Friday April 22, 2016, 10:45 – 11:30 am**

- 4A - First Office for Injury, Sunnybrook Hospital – What does "safe" mean to you? Injury Prevention strategies to reduce the incidence of concussion
- 4B - Ontario Brain Injury Association – Supporting Students with Concussions
- 4C - EMPWR Foundation
- 4D - Holland Bloorview – Pediatric Concussion
- 4E - University of Ottawa – Impact Characteristics Describing Concussive Injuries in Youth
- 4F - Ophea – One Year In: Concussion Policy Management and Evaluation

- **Protection** seems to be of higher importance in the breakout sessions due to the number of presentations available during each session

- **Protocol** seems to be the least important during these breakout sessions

- **Non-repeaters**

- LifeMark Health – Active Recovery: Rehabilitation for Persistent Concussion Symptoms
- Brock University – From research to practice: Applied strategies to assist students' return to the classroom following a concussion
- University of Ottawa – Impact Characteristics Describing Concussive Injuries in Youth
- District School Board of Niagara – HEAD STRONG… Playing Safe, Staying Healthy